

# INSTALLATION RESTORATION PROGRAM

## FINAL REMEDIAL INVESTIGATION REPORT

### APPENDICES

110th FIGHTER WING  
MICHIGAN AIR NATIONAL GUARD  
BATTLE CREEK, MICHIGAN

JUNE 1996

19960801 107



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**HAZARDOUS WASTE REMEDIAL ACTIONS PROGRAM**  
**Environmental Restoration and Waste Management Programs**

Oak Ridge, Tennessee 37831-7606  
managed by LOCKHEED MARTIN ENERGY SYSTEMS, INC.  
for the U.S. DEPARTMENT OF ENERGY under contract DE-AC05-84OR21400

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1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE June 1996	3. REPORT TYPE AND DATES COVERED Remedial Investigation		
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13. ABSTRACT (Maximum 200 words) Remedial Investigation Report of Sites 1 and 3, AOC B, and base boundary wells at WK Kellogg, Battle Creek, MI, volume II. A Remedial Investigation was performed at WK Kellogg to delineate the horizontal and vertical extent of contamination. The sites involved in this investigation include: Site 1 -- Fuel Tank Farm/ AOC B -- Motor Pool Drainage Ditch; Site 3 -- Fire Training Area; Base Boundary Wells. The recommendations are that Site 1/ AOC B, and Site 3 continue on to a Feasibility Study and Remediation.				
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G - Grant	TA - Task
PE - Program Element	WU - Work Unit Accession No.

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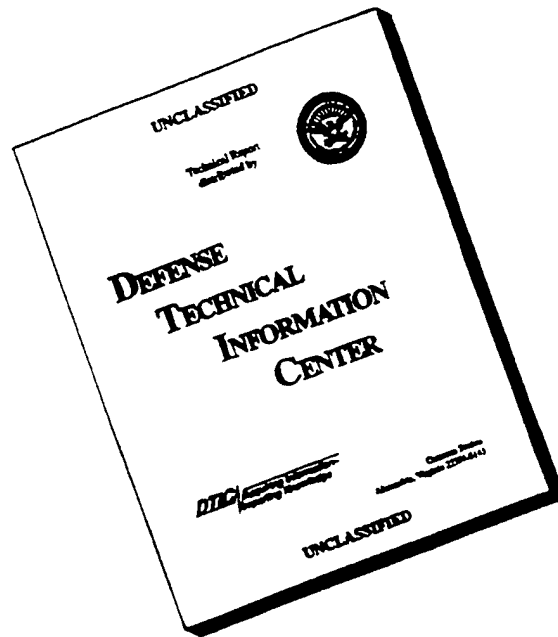
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FINAL  
INSTALLATION RESTORATION PROGRAM  
REMEDIAL INVESTIGATION REPORT

110th FIGHTER WING  
MICHIGAN AIR NATIONAL GUARD  
BATTLE CREEK, MICHIGAN

*Submitted to:*

AIR NATIONAL GUARD READINESS CENTER  
ANDREWS AFB, MARYLAND

*Submitted by:*

HAZARDOUS WASTE REMEDIAL ACTIONS PROGRAM  
LOCKHEED MARTIN ENERGY SYSTEMS, INC.  
Oak Ridge, Tennessee 37831

*for the:*

U.S. DEPARTMENT OF ENERGY

*Prepared by:*

EARTH TECH, Inc.  
Oak Ridge, Tennessee 37830

JUNE 1996

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**APPENDIX A: FIELD CHANGE REQUEST FORMS**

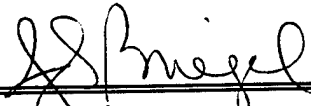
Copy each  
for K-20 files

Number 01

TECHNICAL RECORD OF PROJECT CHANGE	
1a. Project Title: 110th Fighter Group, Michigan Air National Guard, Battle Creek, Michigan	
1b. Contract No.: 43B-89785C	1c. Task Order No.: K-20
1d. SOW Date: February 3, 1994	1e. Affected SOW Task: Task 08
1f. Description of and Justification for Change: Add water quality parameters to May 1994 round of groundwater analyses (see attached)	
2a. Effective Start Date: 2/6/94	2b. End Date:
2c. Impact on Overall Project Schedule/Deliverables: No impact	
3. Estimated Cost Impacts: \$4702 (see attached)	
3a. Est. Labor Hours: N/A	Est. Labor Cost
3b. Est. Persons/Trips: N/A	Est. Travel Cost
3c. Subcontractor 1: \$4702 (laboratory)	Est. Sub 1 Cost
3d. Subcontractor 2: N/A	Est. Sub 2 Cost
3e. Other Direct Costs: N/A	Est. ODCs Cost
EST. TOTAL COST \$4702	
4a. Requested Action: Approve as requested	
4b. Date Needed:	
4c. The HAZWRAP Project Manager is notified of the need for change in project cost, schedule, direction, or scope. This form does NOT satisfy Sect. 3, "Changes," of contract Terms and Conditions.	
Submitted by: Jack Briegel <i>J. Briegel</i> Date: 2/6/95	
5. Acknowledgement of Receipt: HAZWRAP Project Manager (Initial Only) <i>JPC</i> Date: 2-7-95	
6. Distribution by HAZWRAP	
Energy Systems:	
___ GRP Ldr ___	___ Buyer ___
___ Hydro ___	___ QA ___
___ QC ___	
Sponsor: ___ Project Officer	
Subcontractor: ___ Project Manager	

TECHNICAL RECORD OF PROJECT CHANGE	
1a. Project Title: 110th Fighter Group, Michigan Air National Guard, Battle Creek, Michigan	
1b. Contract No.: 43B-99785C	1c. Task Order No.: K-20
1d. SOW Date: February 3, 1994	1e. Affected SOW Task: Task 08
1f. Description of and Justification for Change: Add all metals included in the Michigan 10 metals list to Site 1 soil analysis (see attached)	
2a. Effective Start Date: 2/8/94	2b. End Date:
2c. Impact on Overall Project Schedule/Deliverables: No Impact	
3. Estimated Cost Impacts: \$ (see attached)	
3a. Est. Labor Hours: N/A	Est. Labor Cost
3b. Est. Persons/Trips: N/A	Est. Travel Cost
3c. Subcontractor 1: \$4,500	Est. Sub 1 Cost \$4,500 (unburdened)
3d. Subcontractor 2: N/A	Est. Sub 2 Cost
3e. Other Direct Costs: N/A	Est. ODCs Cost
EST. TOTAL COST \$5,199	
4a. Requested Action: Approve as requested	
4b. Date Needed: 2/13/95	
4c. The HAZWRAP Project Manager is notified of the need for change in project cost, schedule, direction, or scope. This form does NOT satisfy Sect. 3, "Changes," of contract Terms and Conditions.	
Submitted by: Jack Brizel (J. Brizel) Date: 2/6/95	
5. Acknowledgement of Receipt: HAZWRAP Project Manager (Initial Only) <i>TFC</i> Date: 2-7	
6. Distribution by HAZWRAP Energy Systems:	
<input type="checkbox"/> GRP Ldr _____ <input type="checkbox"/> Hydro _____ <input type="checkbox"/> QC _____	Buyer _____ QA _____ _____
Sponsor: _____ Project Officer _____ Subcontractor: _____ Project Manager _____	

C:\bator\ktpo.03

TECHNICAL RECORD OF PROJECT CHANGE	
1a. Project Title: 110th Fighter Group, Michigan Air National Guard, Battle Creek, Michigan	
1b. Contract No.: 43B-99785C	1c. Task Order No.: K-20
1d. SOW Date: February 3, 1994	1e. Affected SOW Task: Task 09 (RI Report)
1f. Description of and Justification for Change: Add the Area of Concern B soils, investigated during the PA/SI, into the Site 1 Remedial Investigation risk assessment. Include the AOC B soil risk assessment into the Remedial Investigation report.	
2a. Effective Start Date: 5/1/95	2b. End Date:
2c. Impact on Overall Project Schedule/Deliverables: No impact	
3. Estimated Cost Impacts: see following breakdown	
3a. Est. Labor Hours: 24	Est. Labor Cost: \$1,000
3b. Est. Persons/Trips:----	Est. Travel Cost ---
3c. Subcontractor 1:----	Est. Sub 1 Cost ----
3d. Subcontractor 2:-----	Est. Sub 2 Cost ----
3e. Other Direct Costs: -----	Est. ODCs Cost ----
EST. TOTAL COST \$1,000	
4a. Requested Action: Approve as requested	
4b. Date Needed:	
4c. The HAZWRAP Project Manager is notified of the need for change in project cost, schedule, direction, or scope. This form does NOT satisfy Sect. 3, "Changes," of contract Terms and Conditions.	
Submitted by: 	Date: 5/2/95
5. Acknowledgement of Receipt: HAZWRAP Project Manager (Initial Only)	
Date:	
6. Distribution by HAZWRAP Energy Systems:	
<input type="checkbox"/> GRP Ldr _____	<input type="checkbox"/> Buyer _____
<input type="checkbox"/> Hydro _____	<input type="checkbox"/> QA _____
<input type="checkbox"/> QC _____	Sponsor: <input type="checkbox"/> Project Officer  Subcontractor: <input type="checkbox"/> Project Manager

To: Tom Cady (615) 435-3709 (Rm)

Field change No. 2  
Page 1 of 1

## FIGURE 2-10 Field Change Request

Project name <u>110th Po, MIANG, BATTLE CREEK</u>	Project Number <u>948901-08</u>
Applicable Document <u>DRAFT FINAL R&amp;WP</u>	Date <u>11/8/94</u>

Description: Add one optional GW sampling point 16W12: add soil borings as illustrated on the attached mapMinor change ☒ Major change ☐ Major project impact ☐Requested by: Jack Briegel

Reason for change:

1. Two source areas have been identified at Site 1 the tanks themselves and a source south of the tanks (16W12); the abandoned fuel line is a suspected source; these sampling points will investigate this suspect  
Recommended disposition: source  
can approve as per recommended

Impact on present and completed work:

no significant impactAccepted ☒ Rejected ☐ Signature J. Briegel Date 11/8/94

Project Manager

Accepted ☐ Rejected ☐ Signature N/A Date \_\_\_\_\_

Project QA/QC Officer

(Required prior to implementation of major changes)

Accepted ☐ Rejected ☐ Signature \_\_\_\_\_ Date \_\_\_\_\_

Program Manager

Accepted ☐ Rejected ☐ Signature \_\_\_\_\_ Date \_\_\_\_\_

Program QA/QC Officer

(Required prior to implementation of changes with major project impact)

Approved ☐ Rejected ☐ Signature Tom Cady Date 11-8-94

CLIENT Project Manager

Final Disposition \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_

FORM 2-1  
3/20/93


 Field change No. 3 RI  
 Page 1 of 1

### FIGURE 2-10 Field Change Request

Project name 110th EG Mining RI Project Number 948901-08  
 Applicable Document Draft Final RI Work Plan Date Sept. 1994

Description: change groundwater sampling methodology - precleaned Teflon bailers will be used to collect the samples - no rinsates will be collected from the bailers

Minor change ☒ Major change ☐ Major project impact ☐

Requested by: Jack Bruegel

#### Reason for change:

sample integrity is not affected: the use of disposable bailers eliminates the potential that samples can be cross-contaminated by decontaminated, non-dedicated bailers  
using

#### Recommended disposition:

approve as recommended

#### Impact on present and completed work:

no impact - minor cost savings by eliminating rinsate blanks

Accepted ☒ Rejected ☐ Signature J. Bruegel Date 12/28/94  
 Project Manager

Accepted ☐ Rejected ☐ Signature \_\_\_\_\_ Date \_\_\_\_\_  
 Project QA/QC Officer

#### (Required prior to implementation of major changes)

Accepted ☐ Rejected ☐ Signature \_\_\_\_\_ Date \_\_\_\_\_  
 Program Manager

Accepted ☐ Rejected ☐ Signature \_\_\_\_\_ Date \_\_\_\_\_  
 Program QA/QC Officer

#### (Required prior to implementation of changes with major project impact)

Approved ☐ Rejected ☐ Signature Tom Cash Date 12-29-94  
 CLIENT Project Manager

#### Final Disposition

Signature \_\_\_\_\_ Date \_\_\_\_\_



Field change No. 5 RIPage 1 of 1

## FIGURE 2-10 Field Change Request

Project name <u>110th FG, MIANG Battle Creek, Mich</u>	Project Number <u>948901-</u>
Applicable Document <u>Draft Final RI WP</u>	Date <u>12/28/94</u>

Description: <sup>JS 12/28/94</sup> Sample only BC-MW4 and BC-MW16 (new wells). Collect samples for VOC, SVOC, TCM metals,  $\text{NO}_3^-$   $\text{SO}_4^{2-}$  and  $\text{Cl}^-$ ; confirm at Level "B" GA.

Minor change ☒ Major change ☐ Major project impact ☐

Requested by: Jack Briegel

Reason for change: The MDNR has taken a position stating that a majority of the base monitoring wells are improperly constructed, and are only useable to collect "screening" data (Dec 12, 1994 letter - Lori Aronoff to Capt. Grob Vollmarhausen). Until this issue is resolved the base boundary wells will not be sampled. <sup>remaining</sup>

Recommended disposition:  
approve as recommended

Impact on present and completed work:  
no impact

Accepted ☒Rejected ☐Signature J. Briegel

Project Manager

Date 12-28-94Accepted ☐Rejected ☐

Signature \_\_\_\_\_

Project QA/QC Officer

Date \_\_\_\_\_

(Required prior to implementation of major changes)

Accepted ☐Rejected ☐

Signature \_\_\_\_\_

Program Manager

Date \_\_\_\_\_

Accepted ☐Rejected ☐

Signature \_\_\_\_\_

Program QA/QC Officer

Date \_\_\_\_\_

(Required prior to implementation of changes with major project impact)

Approved ☐Rejected ☐Signature Tom Oady

CLIENT Project Manager

Date 12-28-94

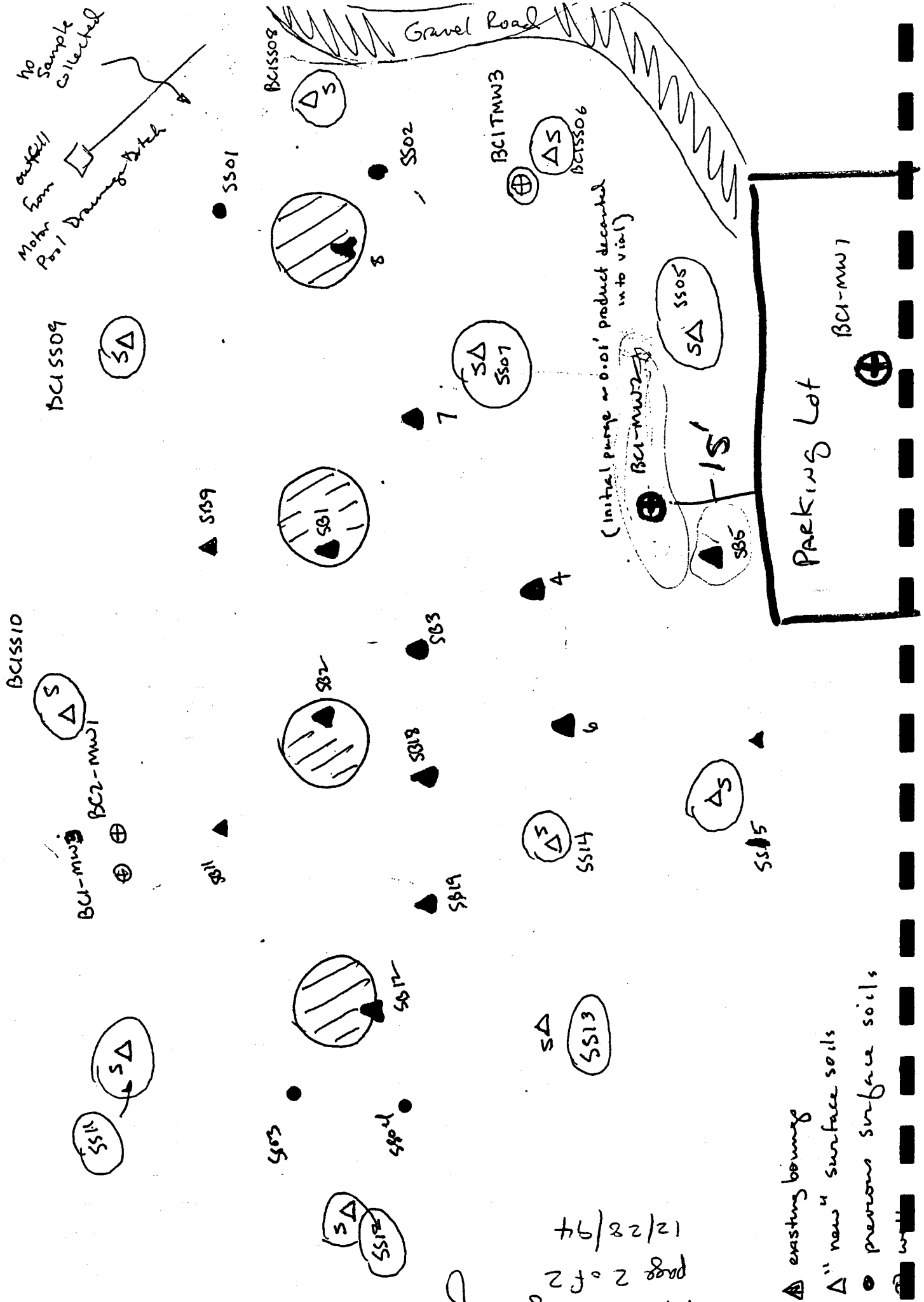
Final Disposition \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_

FormOE-1  
4/30/89

12/19/94

Field change request #C  
 page 2 of 2  
 12/28/94



- ▲ existing bounge
- Δ "new" surface soils
- previous surface soils
- ↔ with

## **APPENDIX B: SCREENING DATA**

- Summary Tables
- VOC Groundwater
- SVOC Groundwater
- VOC - SVOC Groundwater QA
- PNA - Soil
- VOC - Soil

**Table B-1 Soil Screening Results  
110th FG, MIANG, Battle Creek, Michigan**

Sample Location	Date Sampled/ Depth (ft bgs)	PAH Concentration (ppb)	VOCs <sup>(a)</sup>	
			Ethylbenzene Concentration (µg/kg)	Total Xylene Concentration (µg/kg)
Site 1				
1SB1 (b)	11/6/94 00-01	2000	ND	ND
1SB1 (b)	11/6/94 05-07	< 200	17	83
1SB1	11/6/94 10-12	230	ND	ND
1SB1	11/6/94 15-17	290	ND	ND
1SB1 (b)	11/6/94 20-22	440	ND	ND
1SB1	11/6/94 25-27	< 200	ND	ND
1SB1D	11/6/94 25-27	200	ND	ND
1SB2 (b)	11/6/94 00-01	> 5,000	ND	ND
1SB2	11/6/94 05-07	560	ND	ND
1SB2 (b)	11/6/94 10-12	240	ND	ND
1SB2	11/6/94 15-17	5,000	24	230
1SB2 (b)	11/6/94 20-22	> 5,000	180	1,100

Table B-1 Soil Screening Results (continued)  
110th FG, MIANG, Battle Creek, Michigan

Sample Location	Date Sampled/ Depth (ft bgs)	PAH Concentration (ppb)	VOCs <sup>(a)</sup>	
			Ethylbenzene Concentration ( $\mu\text{g/kg}$ )	Total Xylene Concentration ( $\mu\text{g/kg}$ )
1SB3 (b)	11/8/94 00-01	3,700	ND	ND
1SB3	11/8/94 05-07	< 200	NS	NS
1SB3D	11/8/94 05-07	< 200	NS	NS
1SB3	11/8/94 10-12	< 200	NS	NS
1SB3	11/8/94 15-17	2,200	NS	NS
1SB3 (b)	11/8/94 20-22	230,000	NS	NS
1SB4 (b)	11/6/94 00-01	> 5,000	NS	NS
1SB4	11/6/94 05-07	210	ND	ND
1SB4 (b)	11/6/94 10-12	< 200	ND	ND
1SB4D	11/6/94 10-12	400	ND	ND
1SB4	11/6/94 15-17	410	ND	ND
1SB5 (b)	11/7/94 00-01	4,900	NS	NS

Table B-1 Soil Screening Results (continued)  
110th FG, MIANG, Battle Creek, Michigan

Sample Location	Date Sampled/ Depth (ft bgs)	PAH Concentration (ppb)	VOCs <sup>(a)</sup>		
			Ethylbenzene Concentration ( $\mu\text{g/kg}$ )	Total Xylene Concentration ( $\mu\text{g/kg}$ )	
1SB5	11/7/94 05-07	250	ND	ND	ND
1SB5 (b)	11/7/94 10-12	520	ND	ND	ND
1SB5	11/7/94 15-17	< 200	ND	ND	ND
1SB5 (b)	11/7/94 20-22	< 200	ND	ND	ND
1SB5	11/7/94 25-27	> 5,000	ND	ND	ND
1SB5D	11/7/94 25-27	> 5,000	ND	ND	ND
1SB6	11/9/94 10-12	< 200	ND	ND	ND
1SB7 (b)	11/9/94 00-01	> 5,000	NS	NS	NS
1SB7	11/9/94 05-07	< 200	NS	NS	NS
1SB7 (b)	11/9/94 10-12	420	NS	NS	NS
1SB7	11/9/94 15-17	260	NS	NS	NS
1SB8 (b)	11/7/94 00-01	> 5,000	NS	NS	NS

Table B-1 Soil Screening Results (continued)  
110th FG, MIANG, Battle Creek, Michigan

Sample Location	Date Sampled/ Depth (ft bgs)	PAH Concentration (ppb)	VOCs <sup>(a)</sup>	
			Ethylbenzene Concentration ( $\mu\text{g/kg}$ )	Total Xylene Concentration ( $\mu\text{g/kg}$ )
1SB8	11/7/94 05-07	< 200	ND	ND
1SB8	11/7/94 10-12	< 200	ND	ND
1SB8	11/7/94 15-17	NA	ND	ND
1SB8 (b)	11/7/94 20-22	270	ND	ND
1SB8D	11/7/94 20-22	300	NS	NS
1SB9 (b)	11/9/94 00-01	1,200	NS	NS
1SB9	11/9/94 05-07	< 200	NS	NS
1SB9	11/9/94 10-12	1,100	NS	NS
1SB9	11/9/94 15-17	< 200	NS	NS
1SB9	11/9/94 20-22	210	NS	NS
1SB11 (b)	11/9/94 00-01	870	NS	NS
1SB11	11/9/94 05-07	< 200	NS	NS

Table B-1 Soil Screening Results (continued)  
110th FG, MIANG, Battle Creek, Michigan

Sample Location	Date Sampled/ Depth (ft bgs)	PAH Concentration (ppb)	VOCs <sup>(a)</sup>	
			Ethylbenzene Concentration ( $\mu\text{g/kg}$ )	Total Xylene Concentration ( $\mu\text{g/kg}$ )
1SB11	11/9/94 10-12	240	ND	ND
1SB11	11/9/94 15-17	< 200	NS	NS
1SB11 (b)	11/9/94 19-23	< 200	NS	NS
1SB11D (b)	11/9/94 19-23	< 200	NS	NS
1SB12 (b)	11/7/94 00-01	2,900	NS	NS
1SB12	11/7/94 05-07	< 200	ND	ND
1SB12	11/7/94 15-17	< 200	ND	ND
1SB12 (b)	11/7/94 20-22	< 200	ND	ND
1SB13	11/8/94 10-12	< 200	ND	ND
1SB14	11/8/94 10-12	< 200	ND	ND
1SB15 (b)	11/8/94 10-12	< 200	ND	ND
1SB16	11/8/94 10-12	300	ND	ND



Table B-1 Soil Screening Results (continued)  
110th FG, MIANG, Battle Creek, Michigan

Sample Location	Date Sampled/ Depth (ft bgs)	PAH Concentration (ppb)	VOCs <sup>(a)</sup>	
			Ethylbenzene Concentration ( $\mu\text{g/kg}$ )	Total Xylene Concentration ( $\mu\text{g/kg}$ )
1SB17	11/8/94 10-12	< 200	ND	ND
1SB18	11/9/94 05-07	< 200	NS	NS
1SB18	11/9/94 10-12	< 200	NS	NS
1SB18 (b)	11/9/94 15-17	> 5,000	NS	NS
1SB18D	11/9/94 15-17	> 5,000	NS	NS
1SB18	11/9/94 20-22	> 5,000	NS	NS
1SB19 (b)	11/10/94 00-01	790	NS	NS
1SB19	11/9/94 15-17	< 200	NS	NS
1SB19	05-07	< 200	NS	NS
1SB19	10-12	< 200	NS	NS
1SB19 (b)	20-22	< 200	NS	NS
1MW2	05-07	< 200	NS	NS
1MW2 (b)	10-12	< 200	NS	NS
1MW2	15-17	< 200	NS	NS

Table B-1 Soil Screening Results (continued)  
110th FG, MIANG, Battle Creek, Michigan

Sample Location	Date Sampled/ Depth (ft bgs)	PAH Concentration (ppb)	VOCs <sup>(a)</sup>	
			Ethylbenzene Concentration ( $\mu\text{g/kg}$ )	Total Xylene Concentration ( $\mu\text{g/kg}$ )
1MW2 (b)	20-22	< 200	NS	NS
BCISS01 (b)	11/10/94 00-01	> 5,000	NS	NS
BCISS02 (b)	11/10/94 00-01	> 5,000	NS	NS
BCISS03 (b)	11/10/94 00-01	> 5,000	NS	NS
BCISS04 (b)	11/10/94 00-01	3,400	NS	NS
BCISS05	12/17/94 00-01	> 5000	NS	NS
BCISS06	12/17/94 00-01	3700	NS	NS
BCISS07	12/17/94 00-01	> 50000	NS	NS
BCISS08	12/17/94 00-01	31000	NS	NS
BCISS09	12/17/94 00-01	4300	NS	NS
BCISS9D	12/17/94 00-01	4700	NS	NS
BCISS10	12/17/94 00-01	460000	NS	NS
BCISS11 (b)	12/17/94 00-01	< 200	NS	NS

Table B-1 Soil Screening Results (continued)  
110th FG, MIANG, Battle Creek, Michigan

Sample Location	Date Sampled/ Depth (ft bgs)	PAH Concentration (ppb)	VOCs <sup>(a)</sup>	
			Ethylbenzene Concentration ( $\mu\text{g/kg}$ )	Total Xylene Concentration ( $\mu\text{g/kg}$ )
BCISS12 (b)	12/17/94 00-01	< 200	NS	NS
BCISS13 (b)	12/17/94 00-01	< 200	NS	NS
BCISS14 (b)	12/17/94 00-01	660	NS	NS
BCISS15	12/17/94 00-01	4600	NS	NS
Background				
BCBGSS01	12/17/94 00-01	< 1000	NS	NS
BCBGSS02	12/17/94 00-01	< 1000	NS	NS
BCBGSS03	12/17/94 00-01	> 1000	NS	NS
BCBGSS03D	12/17/94 00-01	> 1000	NS	NS
BCBGSS04	12/17/94 00-01	> 1000	NS	NS
BCBGSS05	12/17/94 00-01	< 1000	NS	NS
BCBGSS06	12/17/94 00-01	< 1000	NS	NS
BCBGSS06D	12/17/94 00-01	< 1000	NS	NS

Table B-1 Soil Screening Results (continued)  
110th FG, MIANG, Battle Creek, Michigan

Sample Location	Date Sampled/ Depth (ft bgs)	PAH Concentration (ppb)	VOCs <sup>(a)</sup>	
			Ethylbenzene Concentration (µg/kg)	Total Xylene Concentration (µg/kg)
BCBGSS07	12/17/94 00-01	> 1000	NS	NS
BCBGSS08	12/17/94 00-01	> 1000	NS	NS
BCBG1 (b)	12/17/94 05-07	< 1000	NS	NS
BCBG2 (b)	12/17/94 05-07	< 1000	NS	NS
BCBG3 (b)	12/17/94 05-07	< 1000	NS	NS
BCBG4 (b)	12/17/94 05-07	< 1000	NS	NS

bgs below ground surface

VOC Volatile organic compounds

NS - Not Sampled

ND - Not Detected

(a) - Benzene, toluene, TCE, PCE, and DCE were all non-detect in the soil screening results

(b) - Samples were confirmed

PAH Polyaromatic Hydrocarbon

µg/kg micrograms/kilogram

**Table B-2 Detections of Organics in Groundwater Screening Samples**  
**110th FG, MIANG, Battle Creek, Michigan**

Sample Location	1GW1	1GW3	1GW4	1GW6	1GW10	1GW12	1GW13	1GW14	BC1TMW3	BC2-MW1
Date Sampled Depth (ft bgs)	12/15/94 40-38	11/2/94 34-36	11/3/94 26-28	11/2/94 28-30	12/15/94 25-27	11/6/94 43-45	12/14/94 25-27	12/15/94 40-42	12/15/94 25-32	11/6/94 NA
VOCs <sup>2</sup> (µg/l)(a)										
1,2,4-Trimethylbenzene					5.9					
1,3,5-Trimethylbenzene					10					
Benzene	2.1									
Chlorobenzene					2.1					
Chloroform										
Ethylbenzene			5.2	2.3	1.8					
Isopropylbenzene					2.8					
Methylene Chloride								0.5		
p-Isopropyltoluene					2.3					
s-Butylbenzene					3.6					
Tetrachloroethene					35			4.45	2.4	
Toluene	21	1.9			21			47.6	2.6	
Xylenes (o, m, & p)				25	7.3					
SVOCs <sup>1</sup> (µg/l)(a)										
1-Methylnaphthalene				1900	60	5.0	21			7.0
2-Methylnaphthalene				2500	26	7.0				7.0
Fluorene				420						
Naphthalene					473					6.0
Phenanthrene				880						

1 VOCs - Volatile Organic Compounds.

2 SVOCs - Semivolatile Organic Compounds.

3 Naphthalene was reported on the VOC and SVOC lists; this value is the highest of the two results.

Sample location - D indicates duplicate sample.

(a) No entry indicates no detection.

µg/l micrograms/liter

November 1994 samples were analyzed for 6 VOCs (EPA SW8021) and 13 PAH compounds (EPA SW846 8270).

December 1994 samples were analyzed for 47 VOCs (EPA SW846 8260) and 60 SVOCs (EPA SW846 8270).

## BATTLE CREEK ANG VOA'S

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1GW1

25-27'

Submittal Number 32565- 1  
Date Sampled: 11/03/94 Time: 16:10  
Date Received: 11/04/94 Time: 08:00  
Analysis Date: 11/07/94  
Lab Sample No: 101952

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	<1.0	Tetrachloroethene	<1.0
cis-1,2-Dichloroethylene	<1.0	Toluene	<1.0
trans-1,2-Dichloroethene	<1.0	Trichloroethylene	<1.0
Ethylbenzene	<1.0	Xylene, Total	<3.0

LABORATORY TESTS RESULTS  
01/10/95

JOB NUMBER: 114420

CUSTOMER: Earth Tech

ATTN: Carol Smith

CLIENT I.D.: Sample ID: 1GW14038 (106569)

LABORATORY I.D.: 114420-0001

DATE SAMPLED: 12/15/94

DATE RECEIVED: 12/27/94

TIME SAMPLED: 11:30

TIME RECEIVED: 15:00

WORK DESCRIPTION: Project ID: 110FG, MIANG

REMARKS: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics in Water		*1		USEPA 8260	12/29/94	RDC
Dichlorodifluoromethane	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Trichlorofluoromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
Methylene chloride	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
2,2-Dichloropropane	ND	1.0	ug/l			
cis-1,2-Dichloroethene	ND	1.0	ug/l			
Chloroform	ND	1.0	ug/l			
Bromochloromethane	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
1,1-Dichloropropene	ND	1.0	ug/l			
Benzene	2.1	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Dibromomethane	ND	1.0	ug/l			
Toluene	21	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Tetrachloroethene	ND	1.0	ug/l			
1,3-Dichloropropane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,2-Dibromoethane	ND	1.0	ug/l			
1-Chlorohexane	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
1,1,1,2-Tetrachloroethane	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
Styrene	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Isopropylbenzene	ND	1.0	ug/l			
1,1,2,2-Tetrachloroethane	ND	1.0	ug/l			
Bromobenzene	ND	1.0	ug/l			
1,2,3-Trichloropropane	ND	1.0	ug/l			
N-propylbenzene	ND	1.0	ug/l			
2-Chlorotoluene	ND	1.0	ug/l			
1,3,5-Trimethylbenzene	ND	1.0	ug/l			
4-Chlorotoluene	ND	1.0	ug/l			

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LABORATORY TESTS RESULTS  
01/10/95

JOB NUMBER: 114420

CUSTOMER: Earth Tech

ATTN: Carol Smith

CLIENT I.D.: Sample ID: 1GW14038 (106569)

LABORATORY I.D.: 114420-0001

DATE SAMPLED: 12/15/94

DATE RECEIVED: 12/27/94

TIME SAMPLED: 11:30

TIME RECEIVED: 15:00

WORK DESCRIPTION: Project ID: 110FG, MIANG

REMARKS: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
t-butylbenzene	ND	1.0	ug/l			
1,2,4-Trimethylbenzene	ND	1.0	ug/l			
s-butylbenzene	ND	1.0	ug/l			
p-Isopropyltoluene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
n-butylbenzene	ND	1.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,2-Dibromo-3-chloropropane	ND	1.0	ug/l			
1,2,4-Trichlorobenzene	ND	1.0	ug/l			
Hexachlorobutadiene	ND	1.0	ug/l			
Naphthalene	ND	1.0	ug/l			
1,2,3-Trichlorobenzene	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	100	0	%	86-115 %		
1,2-Dichloroethane-d4	102	0	%	70-121 %		
Toluene-d8	100	0	%	88-110 %		
Date Analyzed:	12/28/94	0	Month/Day/Year			

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## BATTLE CREEK ANG VOA'S

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1GW3

Submittal Number 32565- 1  
Date Sampled: 11/03/94 Time: 10:30  
Date Received: 11/03/94 Time: 14:30  
Analysis Date: 11/03/94  
Lab Sample No: 101896

25'-27'

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	<1.0	Tetrachloroethene	<1.0
cis-1,2-Dichloroethylene	<1.0	Toluene	<1.0
trans-1,2-Dichloroethene	<1.0	Trichloroethylene	<1.0
Ethylbenzene	<1.0	Xylene, Total	<3.0



## BATTLE CREEK ANG VOA'S

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1GW3D

25'-27'

Submittal Number 32565- 1  
Date Sampled: 11/03/94 Time: 10:30  
Date Received: 11/03/94 Time: 14:30  
Analysis Date: 11/03/94  
Lab Sample No: 101897

Parameter	Result ug/l
-----------	----------------

Benzene	<1.0
cis-1,2-Dichloroethylene	<1.0
trans-1,2-Dichloroethylene	<1.0
Ethylbenzene	<1.0

Parameter	Result ug/l
-----------	----------------

Tetrachloroethene	<1.0
Toluene	<1.0
Trichloroethylene	<1.0
Xylene, Total	<3.0

LABORATORY TESTS RESULTS  
01/10/95

JOB NUMBER: 114420

CUSTOMER: Earth Tech

ATTN: Carol Smith

CLIENT I.D.: Sample ID: 1GW3 (106574)

DATE SAMPLED: 12/15/94

TIME SAMPLED: 12:10

WORK DESCRIPTION: Project ID: 110FG, MIANG

LABORATORY I.D.: 114420-0006

DATE RECEIVED: 12/27/94

TIME RECEIVED: 15:00

REMARKS: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Volatile Organics in Water		*1		USEPA 8260	12/29/94	RDC
Dichlorodifluoromethane	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Trichlorofluoromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
Methylene chloride	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
2,2-Dichloropropane	ND	1.0	ug/l			
cis-1,2-Dichloroethene	ND	1.0	ug/l			
Chloroform	ND	1.0	ug/l			
Bromochloromethane	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
1,1-Dichloropropene	ND	1.0	ug/l			
Benzene	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Dibromomethane	ND	1.0	ug/l			
Toluene	1.9	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Tetrachloroethene	ND	1.0	ug/l			
1,3-Dichloropropane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,2-Dibromoethane	ND	1.0	ug/l			
1-Chlorohexane	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
1,1,1,2-Tetrachloroethane	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
Styrene	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Isopropylbenzene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Bromobenzene	ND	1.0	ug/l			
1,2,3-Trichloropropane	ND	1.0	ug/l			
N-propylbenzene	ND	1.0	ug/l			
2-Chlorotoluene	ND	1.0	ug/l			
1,3,5-Trimethylbenzene	ND	1.0	ug/l			
4-Chlorotoluene	ND	1.0	ug/l			

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LABORATORY TESTS RESULTS  
01/10/95

OB NUMBER: 114420

CUSTOMER: Earth Tech

ATTN: Carol Smith

CLIENT I.D.: Sample ID: 1GW3 (106574)

LABORATORY I.D.: 114420-0006

DATE SAMPLED: 12/15/94

DATE RECEIVED: 12/27/94

TIME SAMPLED: 12:10

TIME RECEIVED: 15:00

WORK DESCRIPTION: Project ID: 110FG, MIANG

REMARKS: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
t-butylbenzene	ND	1.0	ug/l			
1,2,4-Trimethylbenzene	ND	1.0	ug/l			
s-butylbenzene	ND	1.0	ug/l			
p-Isopropyltoluene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
n-butylbenzene	ND	1.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,2-Dibromo-3-chloropropane	ND	1.0	ug/l			
1,2,4-Trichlorobenzene	ND	1.0	ug/l			
Hexachlorobutadiene	ND	1.0	ug/l			
Naphthalene	ND	1.0	ug/l			
1,2,3-Trichlorobenzene	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	100	0	%	86-115 %		
1,2-Dichloroethane-d4	98	0	%	70-121 %		
Toluene-d8	100	0	%	88-110 %		
Date Analyzed:	12/29/94	0	Month/Day/Year			

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## BATTLE CREEK ANG VOA'S

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1GW4

Submittal Number 32565- 1  
Date Sampled: 11/03/94 Time: 09:10  
Date Received: 11/03/94 Time: 14:30  
Analysis Date: 11/04/94  
Lab Sample No: 101895

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	<5.0	Tetrachloroethene	<5.0
cis-1,2-Dichloroethylene	<5.0	Toluene	<5.0
trans-1,2-Dichloroethene	<5.0	Trichloroethylene	<5.0
Ethylbenzene	5.2	Xylene, Total	<15

## BATTLE CREEK ANG VOA'S

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1GW5

Submittal Number 32565- 1  
Date Sampled: 11/03/94 Time: 14:15  
Date Received: 11/04/94 Time: 08:00  
Analysis Date: 11/04/94  
Lab Sample No: 101951

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	<1.0	Tetrachloroethene	<1.0
cis-1,2-Dichloroethylene	<1.0	Toluene	<1.0
trans-1,2-Dichloroethene	<1.0	Trichloroethylene	<1.0
Ethylbenzene	<1.0	Xylene, Total	<3.0

BATTLE CREEK ANG VOA'S

**EARTH TECH - OAK RIDGE**

Proj: Field Analysis Michigan  
 ANG- Battle Creek  
 Subm: November 2, 1994 sampling  
 Sample: 1GW6

Submittal Number 32565- 1  
 Date Sampled: 11/02/94 Time: 15:05  
 Date Received: 11/02/94 Time: 16:45  
 Analysis Date: 11/03/94  
 Lab Sample No: 101821

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	<2.0	Tetrachloroethene	<2.0
cis-1,2-Dichloroethylene	<2.0	Toluene	<2.0
trans-1,2-Dichloroethene	<2.0	Trichloroethylene	<2.0
Ethylbenzene	2.3	Xylene, Total	25

## BATTLE CREEK ANG VOA'S

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1GW7

Submittal Number 32565- 1  
Date Sampled: 11/04/94 Time: 14:30  
Date Received: 11/04/94 Time: 16:40  
Analysis Date: 11/04/94  
Lab Sample No: 102121

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	<1.0	Tetrachloroethene	<1.0
cis-1,2-Dichloroethylene	<1.0	Toluene	<1.0
trans-1,2-Dichloroethene	<1.0	Trichloroethylene	<1.0
Ethylbenzene	<1.0	Xylene, Total	<3.0



## BATTLE CREEK ANG VOA'S

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1GW8

Submittal Number 32565- 1  
Date Sampled: 11/02/94 Time: 17:30  
Date Received: 11/02/94 Time: 00:00  
Analysis Date: 11/03/94  
Lab Sample No: 101845

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	<1.0	Tetrachloroethene	<1.0
cis-1,2-Dichloroethylene	<1.0	Toluene	<1.0
trans-1,2-Dichloroethene	<1.0	Trichloroethylene	<1.0
Ethylbenzene	<1.0	Xylene, Total	<3.0

## BATTLE CREEK ANG VOA'S

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1GW9

Submittal Number 32565- 1  
Date Sampled: 11/04/94 Time: 16:45  
Date Received: 11/07/94 Time: 08:45  
Analysis Date: 11/06/94  
Lab Sample No: 102128

Parameter	Result ug/l
-----------	----------------

Benzene	<1.0
cis-1,2-Dichloroethylene	<1.0
trans-1,2-Dichloroethylene	<1.0
Ethylbenzene	<1.0

Parameter	Result ug/l
-----------	----------------

Tetrachloroethene	<1.0
Toluene	<1.0
Trichloroethylene	<1.0
Xylene, Total	<3.0

## BATTLE CREEK ANG VOA'S

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1GW10

34'-36'

Submittal Number 32565- 1  
Date Sampled: 11/04/94 Time: 09:30  
Date Received: 11/04/94 Time: 16:40  
Analysis Date: 11/04/94  
Lab Sample No: 102119

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	<1.0	Tetrachloroethene	<1.0
cis-1,2-Dichloroethylene	<1.0	Toluene	<1.0
trans-1,2-Dichloroethene	<1.0	Trichloroethylene	<1.0
Ethylbenzene	<1.0	Xylene, Total	<3.0

## BATTLE CREEK ANG VOA'S

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1GW10D

Submittal Number 32565- 1  
Date Sampled: 11/04/94 Time: 09:30  
Date Received: 11/04/94 Time: 16:40  
Analysis Date: 11/04/94  
Lab Sample No: 102120

34'-36'

Parameter	Result ug/l
Benzene	<1.0
cis-1,2-Dichloroethylene	<1.0
trans-1,2-Dichloroethene	<1.0
Ethylbenzene	<1.0

Parameter	Result ug/l
Tetrachloroethene	<1.0
Toluene	<1.0
Trichloroethylene	<1.0
Xylene, Total	<3.0

LABORATORY TESTS RESULTS  
01/10/95

JOB NUMBER: 114420

CUSTOMER: Earth Tech

ATTN: Carol Smith

CLIENT I.D.: Sample ID: 1GW102527 (106571)

DATE SAMPLED: 12/15/94

TIME SAMPLED: 10:15

WORK DESCRIPTION: Project ID: 110FG, MIANG

LABORATORY I.D.: 114420-0003

DATE RECEIVED: 12/27/94

TIME RECEIVED: 15:00

REMARKS: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics in Water		*1		USEPA 8260	12/29/94	RDC
Dichlorodifluoromethane	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Trichlorofluoromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
Methylene chloride	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
2,2-Dichloropropane	ND	1.0	ug/l			
cis-1,2-Dichloroethene	ND	1.0	ug/l			
Chloroform	ND	1.0	ug/l			
Bromochloromethane	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
1,1-Dichloropropene	ND	1.0	ug/l			
Benzene	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Dibromomethane	ND	1.0	ug/l			
Toluene	21	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Tetrachloroethene	(35)	1.0	ug/l			
1,3-Dichloropropane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,2-Dibromoethane	ND	1.0	ug/l			
1-Chlorohexane	ND	1.0	ug/l			
Chlorobenzene	2.1	1.0	ug/l			
1,1,1,2-Tetrachloroethane	ND	1.0	ug/l			
Ethylbenzene	1.8	1.0	ug/l			
Xylenes (o,m & p)	7.3	3.0	ug/l			
Styrene	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Isopropylbenzene	2.8	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Bromobenzene	ND	1.0	ug/l			
1,2,3-Trichloropropane	ND	1.0	ug/l			
N-propylbenzene	ND	1.0	ug/l			
2-Chlorotoluene	ND	1.0	ug/l			
1,3,5-Trimethylbenzene	10	1.0	ug/l			
4-Chlorotoluene	ND	1.0	ug/l			

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LABORATORY TESTS RESULTS  
01/10/95

DB NUMBER: 114420

CUSTOMER: Earth Tech

ATTN: Carol Smith

CLIENT I.D.: Sample ID: 1GW102527 (106571)

LABORATORY I.D.: 114420-0003

DATE SAMPLED: 12/15/94

DATE RECEIVED: 12/27/94

TIME SAMPLED: 10:15

TIME RECEIVED: 15:00

WORK DESCRIPTION: Project ID: 110FG, MIANG

REMARKS: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
t-butylbenzene	ND	1.0	ug/l			
1,2,4-Trimethylbenzene	5.9	1.0	ug/l			
s-butylbenzene	3.6	1.0	ug/l			
p-Isopropyltoluene	2.3	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
n-butylbenzene	ND	1.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,2-Dibromo-3-chloropropane	ND	1.0	ug/l			
1,2,4-Trichlorobenzene	ND	1.0	ug/l			
Hexachlorobutadiene	ND	1.0	ug/l			
Naphthalene	47	1.0	ug/l			
1,2,3-Trichlorobenzene	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	102	0	%	86-115 %		
1,2-Dichloroethane-d4	98	0	%	70-121 %		
Toluene-d8	100	0	%	88-110 %		
Date Analyzed:	12/29/94	0	Month/Day/Year			

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## BATTLE CREEK ANG VOA'S

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1GW11

Submittal Number 32565- 1  
Date Sampled: 11/04/94 Time: 11:20  
Date Received: 11/04/94 Time: 16:40  
Analysis Date: 11/04/94  
Lab Sample No: 102117

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	<1.0	Tetrachloroethene	<1.0
cis-1,2-Dichloroethylene	<1.0	Toluene	<1.0
trans-1,2-Dichloroethene	<1.0	Trichloroethylene	<1.0
Ethylbenzene	<1.0	Xylene, Total	<3.0

## BATTLE CREEK ANG VOA'S

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1GW12

Submittal Number 32565- 1  
Date Sampled: 11/07/94 Time: 09:00  
Date Received: 11/08/94 Time: 08:25  
Analysis Date: 11/08/94  
Lab Sample No: 102317

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	<1.0	Tetrachloroethene	<1.0
cis-1,2-Dichloroethylene	<1.0	Toluene	<1.0
trans-1,2-Dichloroethene	<1.0	Trichloroethylene	<1.0
Ethylbenzene	<1.0	Xylene, Total	<3.0



"Quack" turn waters  
Dec. 1994

MOBILE LABORATORY DATA

Client: EARTH TECH, Oak Ridge, TN

Location: Battle Creek, MI ANG

Project Number: 27001.01

Sample ID	Compound	Result	Units ug/l or mg/kg*	Matrix	Date Sampled	Time Sampled
1GW13840	Cis-1,2-DCE	<1.0	ug/l	Water	12/14/94	11:35
	Trans-1,2-DCE	<1.0	ug/l	Water	12/14/94	11:35
	Trichloroethylene	<1.0	ug/l	Water	12/14/94	11:35
	Tetrachloroethylene	<1.0	ug/l	Water	12/14/94	11:35
	Benzene	<1.0	ug/l	Water	12/14/94	11:35
	Toluene	<1.0	ug/l	Water	12/14/94	11:35
	Ethylbenzene	<1.0	ug/l	Water	12/14/94	11:35
	Xylene, Total	<3.0	ug/l	Water	12/14/94	11:35

\*Soils analyzed on a wet weight basis.

## MOBILE LABORATORY DATA

Client: EARTH TECH, Oak Ridge, TN

Location: Battle Creek, MI ANG

Project Number: 27001.01

Sample ID	Compound	Result	Units ug/l or mg/kg*	Matrix	Date Sampled	Time Sampled
1GW133133	Cis-1,2-DCE	<1.0	ug/l	Water	12/14/94	13:21
	Trans-1,2-DCE	<1.0	ug/l	Water	12/14/94	13:21
	Trichloroethylene	<1.0	ug/l	Water	12/14/94	13:21
	Tetrachloroethylene	<1.0	ug/l	Water	12/14/94	13:21
	Benzene	<1.0	ug/l	Water	12/14/94	13:21
	Toluene	<1.0	ug/l	Water	12/14/94	13:21
	Ethylbenzene	<1.0	ug/l	Water	12/14/94	13:21
	Xylene, Total	<3.0	ug/l	Water	12/14/94	13:21

\*Soils analyzed on a wet weight basis.

Smith-4/ETOR

## MOBILE LABORATORY DATA

Client: EARTH TECH, Oak Ridge, TN

Location: Battle Creek, MI ANG

Project Number: 27001.01

Sample ID	Compound	Result	Units ug/l or mg/kg*	Matrix	Date Sampled	Time Sampled
1GW132527	Cis-1,2-DCE	<1.0	ug/l	Water	12/14/94	13:45
	Trans-1,2-DCE	<1.0	ug/l	Water	12/14/94	13:45
	Trichloroethylene	<1.0	ug/l	Water	12/14/94	13:45
	Tetrachloroethylene	<1.0	ug/l	Water	12/14/94	13:45
	Benzene	<1.0	ug/l	Water	12/14/94	13:45
	Toluene	<1.0	ug/l	Water	12/14/94	13:45
	Ethylbenzene	<1.0	ug/l	Water	12/14/94	13:45
	Xylene, Total	<3.0	ug/l	Water	12/14/94	13:45

\*Soils analyzed on a wet weight basis.

LABORATORY TESTS RESULTS  
01/10/95

JOB NUMBER: 114420

CUSTOMER: Earth Tech

ATTN: Carol Smith

CLIENT I.D.: Sample ID: 1GW14 (106573)

LABORATORY I.D.: 114420-0005

DATE SAMPLED: 12/15/94

DATE RECEIVED: 12/27/94

TIME SAMPLED: 14:55

TIME RECEIVED: 15:00

WORK DESCRIPTION: Project ID: 110FG, MIANG

REMARKS: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics in Water		*1		USEPA 8260	12/29/94	RDC
Dichlorodifluoromethane	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Trichlorofluoromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
Methylene chloride	1.2	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
2,2-Dichloropropane	ND	1.0	ug/l			
cis-1,2-Dichloroethene	ND	1.0	ug/l			
Chloroform	ND	1.0	ug/l			
Bromochloromethane	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
1,1-Dichloropropene	ND	1.0	ug/l			
Benzene	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Dibromomethane	ND	1.0	ug/l			
Toluene	5.2	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Tetrachloroethene	5.6	1.0	ug/l			
1,3-Dichloropropane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,2-Dibromoethane	ND	1.0	ug/l			
1-Chlorohexane	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
1,1,1,2-Tetrachloroethane	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
Styrene	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Isopropylbenzene	ND	1.0	ug/l			
1,1,2,2-Tetrachloroethane	ND	1.0	ug/l			
Bromobenzene	ND	1.0	ug/l			
1,2,3-Trichloropropane	ND	1.0	ug/l			
N-propylbenzene	ND	1.0	ug/l			
2-Chlorotoluene	ND	1.0	ug/l			
1,3,5-Trimethylbenzene	ND	1.0	ug/l			
4-Chlorotoluene	ND	1.0	ug/l			

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LABORATORY TESTS RESULTS  
01/10/95

JOB NUMBER: 114420

CUSTOMER: Earth Tech

ATTN: Carol Smith

CLIENT I.D.: Sample ID: 1GW14 (106573)

DATE SAMPLED: 12/15/94

TIME SAMPLED: 14:55

WORK DESCRIPTION: Project ID: 110FG, MIANG

LABORATORY I.D.: 114420-0005

DATE RECEIVED: 12/27/94

TIME RECEIVED: 15:00

REMARKS: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
t-butylbenzene	ND	1.0	ug/l			
1,2,4-Trimethylbenzene	ND	1.0	ug/l			
s-butylbenzene	ND	1.0	ug/l			
p-Isopropyltoluene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
n-butylbenzene	ND	1.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,2-Dibromo-3-chloropropane	ND	1.0	ug/l			
1,2,4-Trichlorobenzene	ND	1.0	ug/l			
Hexachlorobutadiene	ND	1.0	ug/l			
Naphthalene	ND	1.0	ug/l			
1,2,3-Trichlorobenzene	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	102	0	%	86-115 %		
1,2-Dichloroethane-d4	98	0	%	70-121 %		
Toluene-d8	100	0	%	88-110 %		
Date Analyzed:	12/29/94	0	Month/Day/Year			

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LABORATORY TESTS RESULTS  
01/10/95

JOB NUMBER: 114420

CUSTOMER: Earth Tech

ATTN: Carol Smith

CLIENT I.D.: Sample ID: 1GW14D (106572)

LABORATORY I.D.: 114420-0004

DATE SAMPLED: 12/15/94

DATE RECEIVED: 12/27/94

TIME SAMPLED: 14:55

TIME RECEIVED: 15:00

WORK DESCRIPTION: Project ID: 110FG, MIANG

REMARKS: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics in Water		*1		USEPA 8260	12/29/94	RDC
Dichlorodifluoromethane	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Trichlorofluoromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
Methylene chloride	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
2,2-Dichloropropane	ND	1.0	ug/l			
cis-1,2-Dichloroethene	ND	1.0	ug/l			
Chloroform	ND	1.0	ug/l			
Bromochloromethane	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
1,1-Dichloropropene	ND	1.0	ug/l			
Benzene	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Dibromomethane	ND	1.0	ug/l			
Toluene	90	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Tetrachloroethene	3.3	1.0	ug/l			
1,3-Dichloropropane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,2-Dibromoethane	ND	1.0	ug/l			
1-Chlorohexane	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
1,1,1,2-Tetrachloroethane	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
Styrene	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Isopropylbenzene	ND	1.0	ug/l			
1,1,2,2-Tetrachloroethane	ND	1.0	ug/l			
Bromobenzene	ND	1.0	ug/l			
1,2,3-Trichloropropane	ND	1.0	ug/l			
N-propylbenzene	ND	1.0	ug/l			
2-Chlorotoluene	ND	1.0	ug/l			
1,3,5-Trimethylbenzene	ND	1.0	ug/l			
4-Chlorotoluene	ND	1.0	ug/l			

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## LABORATORY TESTS RESULTS

01/10/95

JOB NUMBER: 114420

CUSTOMER: Earth Tech

ATTN: Carol Smith

CLIENT I.D.: Sample ID: 1GW14D (106572)

DATE SAMPLED: 12/15/94

TIME SAMPLED: 14:55

WORK DESCRIPTION: Project ID: 110FG, MIANG

LABORATORY I.D.: 114420-0004

DATE RECEIVED: 12/27/94

TIME RECEIVED: 15:00

REMARKS: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
t-butylbenzene	ND	1.0	ug/l			
1,2,4-Trimethylbenzene	ND	1.0	ug/l			
s-butylbenzene	ND	1.0	ug/l			
p-Isopropyltoluene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
n-butylbenzene	ND	1.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,2-Dibromo-3-chloropropane	ND	1.0	ug/l			
1,2,4-Trichlorobenzene	ND	1.0	ug/l			
Hexachlorobutadiene	ND	1.0	ug/l			
Naphthalene	3.4	1.0	ug/l			
1,2,3-Trichlorobenzene	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	100	0	%	86-115 %		
1,2-Dichloroethane-d4	96	0	%	70-121 %		
Toluene-d8	102	0	%	88-110 %		
Date Analyzed:	12/29/94	0	Month/Day/Year			

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LABORATORY TESTS RESULTS  
01/10/95

JOB NUMBER: 114420

CUSTOMER: Earth Tech

ATTN: Carol Smith

CLIENT I.D.: Sample ID: BCITMW3 (106570)

LABORATORY I.D.: 114420-0002

DATE SAMPLED: 12/15/94

DATE RECEIVED: 12/27/94

TIME SAMPLED: 15:55

TIME RECEIVED: 15:00

WORK DESCRIPTION: Project ID: 110FG, MIANG

REMARKS: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics in Water		*1		USEPA 8260	12/29/94	RDC
Dichlorodifluoromethane	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Trichlorofluoromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
Methylene chloride	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
2,2-Dichloropropane	ND	1.0	ug/l			
cis-1,2-Dichloroethene	ND	1.0	ug/l			
Chloroform	ND	1.0	ug/l			
Bromochloromethane	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
1,1-Dichloropropene	ND	1.0	ug/l			
Benzene	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Dibromomethane	ND	1.0	ug/l			
Toluene	2.6	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Tetrachloroethene	2.4	1.0	ug/l			
1,3-Dichloropropane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,2-Dibromoethane	ND	1.0	ug/l			
1-Chlorohexane	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
1,1,1,2-Tetrachloroethane	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
Styrene	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Isopropylbenzene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Bromobenzene	ND	1.0	ug/l			
1,2,3-Trichloropropane	ND	1.0	ug/l			
N-propylbenzene	ND	1.0	ug/l			
2-Chlorotoluene	ND	1.0	ug/l			
1,3,5-Trimethylbenzene	ND	1.0	ug/l			
4-Chlorotoluene	ND	1.0	ug/l			

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LABORATORY TESTS RESULTS  
01/10/95

JOB NUMBER: 114420

CUSTOMER: Earth Tech

ATTN: Carol Smith

CLIENT I.D.: Sample ID: 8CITMW3 (106570)  
DATE SAMPLED: 12/15/94  
TIME SAMPLED: 15:55  
WORK DESCRIPTION: Project ID: 110FG, MIANG

LABORATORY I.D.: 114420-0002  
DATE RECEIVED: 12/27/94  
TIME RECEIVED: 15:00  
REMARKS: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
t-butylbenzene	ND	1.0	ug/l			
1,2,4-Trimethylbenzene	ND	1.0	ug/l			
s-butylbenzene	ND	1.0	ug/l			
p-Isopropyltoluene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
n-butylbenzene	ND	1.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,2-Dibromo-3-chloropropane	ND	1.0	ug/l			
1,2,4-Trichlorobenzene	ND	1.0	ug/l			
Hexachlorobutadiene	ND	1.0	ug/l			
Naphthalene	ND	1.0	ug/l			
1,2,3-Trichlorobenzene	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	102	0	%	86-115 %		
1,2-Dichloroethane-d4	100	0	%	70-121 %		
Toluene-d8	100	0	%	88-110 %		
Date Analyzed:	12/29/94	0	Month/Day/Year			

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## BATTLE CREEK ANG VOA'S

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: BC2MW1

Submittal Number 32565- 1  
Date Sampled: 11/04/94 Time: 17:00  
Date Received: 11/07/94 Time: 08:45  
Analysis Date: 11/05/94  
Lab Sample No: 102127

Parameter	Result ug/l
-----------	----------------

Benzene	<1.0
cis-1,2-Dichloroethylene	<1.0
trans-1,2-Dichloroethene	<1.0
Ethylbenzene	<1.0

Parameter	Result ug/l
-----------	----------------

Tetrachloroethene	<1.0
Toluene	<1.0
Trichloroethylene	<1.0
Xylene, Total	<3.0

PROJECT SPECIFIC FRACTION  
USEPA 8270

**EARTH TECH - OAK RIDGE**

Proj: 110th Fighter Group

MICH A.N.G.

Subm: 03-November-1994 Sampling

Sample: 1GW1

Submittal Number 32429- 3

Date Sampled: 11/03/94 Time: 16:10

Date Received: 11/04/94 Time: 08:00

Analysis Date: 11/08/94

Lab Sample No: 102031

~~25'-27'~~ JSB 6/3/95

Parameter	Result ug/l	Parameter	Result ug/l
Acenaphthene	<5.0	Fluoranthene	<5.0
Acenaphthylene	<5.0	Fluorene	<5.0
Anthracene	<5.0	Indeno (1,2,3-cd) Pyrene	<5.0
Benzo (a) Anthracene	<5.0	Naphthalene	<5.0
Benzo (b&k) Fluoranthene	<5.0	Phenanthrene	<5.0
Benzo (a) Pyrene	<5.0	Pyrene	<5.0
Benzo (g,h,i,) Perylene	<5.0	1-Methylnaphthalene	<5.0
Chrysene	<5.0	2-Methylnaphthalene	<5.0
Dibenzo (a,h) Anthracene	<5.0		

PROJECT SPECIFIC FRACTION  
USEPA 8270

## EARTH TECH - OAK RIDGE

Proj: 110th Fighter Group  
MICH A.N.G.

Subm: 15-December-1994 Sampling

Sample: 1GW14038

Submittal Number 32429- 9

Date Sampled: 12/15/94 Time: 11:30

Date Received: 12/20/94 Time: 10:30

Analysis Date: 01/06/95

Lab Sample No: 106566

1GW1 - 40 - 38

Parameter	Result	Reporting Limit
	ug/l	ug/l
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Bis (2-Chloroethoxy) - Methane	<5.0	5.0
Bis (2-Chloroethyl) Ether	<5.0	5.0
Bis (2-Chloroisopropyl) - Ether	<5.0	5.0
Bis (2-ethylhexyl) - Phthalate	<5.0	5.0
4-Bromophenyl Phenylether	<5.0	5.0
Butyl Benzyl Phthalate	<5.0	5.0
4-Chloro-3-Methylphenol	<5.0	5.0
4-Chloroaniline	<20	20
2-Chloronaphthalene	<5.0	5.0
2-Chlorophenol	<5.0	5.0
4-Chlorophenylphenyl- Ether	<5.0	5.0
Chrysene	<5.0	5.0
Di-n-Butylphthalate	<5.0	5.0
Di-n-Octylphthalate	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Dibenzofuran	<5.0	5.0
3,3'-Dichlorobenzidine	<20	20
2,4-Dichlorophenol	<5.0	5.0
Diethylphthalate	<5.0	5.0
Dimethylphthalate	<5.0	5.0
2,4-Dimethylphenol	<5.0	5.0
4,6-Dinitro-	<20	20
2-Methylphenol		
2,4-Dinitrophenol	<20	20

PROJECT SPECIFIC FRACTION  
USEPA 8270

## EARTH TECH - OAK RIDGE

Proj: 110th Fighter Group

MICH A.N.G.

Subm: 15-December-1994 Sampling

Sample: 1GW14038

Submittal Number 32429- 9

Date Sampled: 12/15/94 Time: 11:30

Date Received: 12/20/94 Time: 10:30

Analysis Date: 01/06/95

Lab Sample No: 106566

1GW1 4038

Parameter	Result	Reporting Limit
	ug/l	ug/l
2,4-Dinitrotoluene	<5.0	5.0
2,6-Dinitrotoluene	<5.0	5.0
Fluoranthene	<5.0	5.0
Fluorene	<5.0	5.0
Hexachlorobenzene	<5.0	5.0
Hexachlorobutadiene	<5.0	5.0
Hexachlorocyclopentadiene	<5.0	5.0
Hexachloroethane	<5.0	5.0
Indeno (1,2,3-cd) Pyrene	<5.0	5.0
Isophorone	<5.0	5.0
2-Methylnaphthalene	<5.0	5.0
2-Methylphenol	<5.0	5.0
4-Methylphenol	<5.0	5.0
N-Nitrosodi-n-Propylamine	<5.0	5.0
N-Nitroso-di-Phenylamine	<5.0	5.0
Naphthalene	<5.0	5.0
2-Nitroaniline	<20	20
3-Nitroaniline	<20	20
4-Nitroaniline	<20	20
Nitrobenzene	<5.0	5.0
2-Nitrophenol	<5.0	5.0
4-Nitrophenol	<20	20
Pentachlorophenol	<20	20
Phenanthrene	<5.0	5.0
Phenol	<5.0	5.0
Pyrene	<5.0	5.0
1,2,4-Trichlorobenzene	<5.0	5.0
2,4,5-Trichlorophenol	<50	50
2,4,6-Trichlorophenol	<5.0	5.0
1-Methylnaphthalene	<5.0	5.0

PROJECT SPECIFIC FRACTION  
USEPA 8270

## EARTH TECH - OAK RIDGE

Proj: 110th Fighter Group  
MICH A.N.G.

Subm: 03-02 November-1994

Sample: IGW3 25-27

Submittal Number 32429- 2

Date Sampled: 11/03/94 Time: 10:30

Date Received: 11/03/94 Time: 14:30

Analysis Date: 11/09/94

Lab Sample No: 101926

Parameter	Result	Reporting Limit
	ug/l	ug/l
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Chrysene	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Fluoranthene	<5.0	5.0
Fluorene	<5.0	5.0
Indeno (1,2,3-cd) Pyrene	<5.0	5.0
Naphthalene	<5.0	5.0
Phenanthrene	<5.0	5.0
Pyrene	<5.0	5.0
1-Methylnaphthalene	<5.0	5.0
2-Methylnaphthalene	<5.0	5.0

PROJECT SPECIFIC FRACTION  
USEPA 8270

## EARTH TECH - OAK RIDGE

Proj: 110th Fighter Group

MICH A.N.G.

Subm: 03-02 November-1994

Sample:

IGW3D



25.27

Submittal Number 32429- 2

Date Sampled: 11/03/94 Time: 10:30

Date Received: 11/03/94 Time: 14:30

Analysis Date: 11/09/94

Lab Sample No: 101927

Parameter	Result	Reporting Limit
	ug/l	ug/l
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Chrysene	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Fluoranthene	<5.0	5.0
Fluorene	<5.0	5.0
Indeno (1,2,3-cd) Pyrene	<5.0	5.0
Naphthalene	<5.0	5.0
Phenanthrene	<5.0	5.0
Pyrene	<5.0	5.0
1-Methylnaphthalene	<5.0	5.0
2-Methylnaphthalene	<5.0	5.0

PROJECT SPECIFIC FRACTION  
USEPA 8270

## EARTH TECH - OAK RIDGE

Proj: 110th Fighter Group

MICH A.N.G.

Subm: 15-December-1994 Sampling

Sample: 1GW3

34-36

Submittal Number 32429- 9

Date Sampled: 12/15/94 Time: 12:10

Date Received: 12/20/94 Time: 10:30

Analysis Date: 01/06/95

Lab Sample No: 106567

Parameter	Result	Reporting Limit
	ug/l	ug/l
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Bis (2-Chloroethoxy) - Methane	<5.0	5.0
Bis (2-Chloroethyl) Ether	<5.0	5.0
Bis (2-Chloroisopropyl) - Ether	<5.0	5.0
Bis (2-ethylhexyl) - Phthalate	<5.0	5.0
4-Bromophenyl Phenylether	<5.0	5.0
Butyl Benzyl Phthalate	<5.0	5.0
4-Chloro-3-Methylphenol	<5.0	5.0
4-Chloroaniline	<20	20
2-Chloronaphthalene	<5.0	5.0
2-Chlorophenol	<5.0	5.0
4-Chlorophenylphenyl- Ether	<5.0	5.0
Chrysene	<5.0	5.0
Di-n-Butylphthalate	<5.0	5.0
Di-n-Octylphthalate	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Dibenzofuran	<5.0	5.0
3,3'-Dichlorobenzidine	<20	20
2,4-Dichlorophenol	<5.0	5.0
Diethylphthalate	<5.0	5.0
Dimethylphthalate	<5.0	5.0
2,4-Dimethylphenol	<5.0	5.0
4,6-Dinitro-	<20	20
2-Methylphenol		
2,4-Dinitrophenol	<20	20



PROJECT SPECIFIC FRACTION  
USEPA 8270

**EARTH TECH - OAK RIDGE**

Proj: 110th Fighter Group

MICH A.N.G.

Subm: 15-December-1994 Sampling

Sample: 1GW3

Submittal Number 32429- 9

Date Sampled: 12/15/94 Time: 12:10

Date Received: 12/20/94 Time: 10:30

Analysis Date: 01/06/95

Lab Sample No: 106567

34-36

Parameter	Result	Reporting Limit
	ug/l	ug/l
2,4-Dinitrotoluene	<5.0	5.0
2,6-Dinitrotoluene	<5.0	5.0
Fluoranthene	<5.0	5.0
Fluorene	<5.0	5.0
Hexachlorobenzene	<5.0	5.0
Hexachlorobutadiene	<5.0	5.0
Hexachlorocyclopentadiene	<5.0	5.0
Hexachloroethane	<5.0	5.0
Indeno (1,2,3-cd) Pyrene	<5.0	5.0
Isophorone	<5.0	5.0
2-Methylnaphthalene	<5.0	5.0
2-Methylphenol	<5.0	5.0
4-Methylphenol	<5.0	5.0
N-Nitrosodi-n-Propylamine	<5.0	5.0
N-Nitroso-di-Phenylamine	<5.0	5.0
Naphthalene	<5.0	5.0
2-Nitroaniline	<20	20
3-Nitroaniline	<20	20
4-Nitroaniline	<20	20
Nitrobenzene	<5.0	5.0
2-Nitrophenol	<5.0	5.0
4-Nitrophenol	<20	20
Pentachlorophenol	<20	20
Phenanthrene	<5.0	5.0
Phenol	<5.0	5.0
Pyrene	<5.0	5.0
1,2,4-Trichlorobenzene	<5.0	5.0
2,4,5-Trichlorophenol	<50	50
2,4,6-Trichlorophenol	<5.0	5.0
1-Methylnaphthalene	<5.0	5.0

PROJECT SPECIFIC FRACTION  
USEPA 8270

## EARTH TECH - OAK RIDGE

Proj: 110th Fighter Group  
MICH A.N.G.Subm: 03-November-1994 Sampling  
Sample: 1GW5

34-36

Submittal Number 32429- 3

Date Sampled: 11/03/94 Time: 14:15

Date Received: 11/04/94 Time: 08:00

Analysis Date: 11/08/94

Lab Sample No: 102030

Parameter	Result ug/l
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Parameter	Result ug/l
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Acenaphthene	<5.0
Acenaphthylene	<5.0
Anthracene	<5.0
Benzo (a) Anthracene	<5.0
Benzo (b&k) Fluoranthene	<5.0
Benzo (a) Pyrene	<5.0
Benzo (g,h,i,) Perylene	<5.0
Chrysene	<5.0
Dibenzo (a,h) Anthracene	<5.0

Fluoranthene	<5.0
Fluorene	<5.0
Indeno (1,2,3-cd) Pyrene	<5.0
Naphthalene	<5.0
Phenanthrene	<5.0
Pyrene	<5.0
1-Methylnaphthalene	<5.0
2-Methylnaphthalene	<5.0

PROJECT SPECIFIC FRACTION  
USEPA 8270

EARTH TECH - OAK RIDGE  
Proj: 110th Fighter Group  
MICH A.N.G.  
Subm: 03-02 November-1994  
Sample: IGW6  
23-30

Submittal Number 32429- 2  
Date Sampled: 11/02/94 Time: 15:05  
Date Received: 11/03/94 Time: 07:30  
Analysis Date: 11/08/94  
Lab Sample No: 101924

Parameter	Result	Reporting Limit
	ug/l	ug/l
Acenaphthene	<250	250
Acenaphthylene	<250	250
Anthracene	<250	250
Benzo (a) Anthracene	<250	250
Benzo (b&k) Fluoranthene	<250	250
Benzo (a) Pyrene	<250	250
Benzo (g,h,i,) Perylene	<250	250
Chrysene	<250	250
Dibenzo (a,h) Anthracene	<250	250
Fluoranthene	<250	250
Fluorene	420	250
Indeno (1,2,3-cd) Pyrene	<250	250
Naphthalene	<250	250
Phenanthrene	880	250
Pyrene	<250	250
1-Methylnaphthalene	1900	250
2-Methylnaphthalene	2500	250

PROJECT SPECIFIC FRACTION  
USEPA 8270

## EARTH TECH - OAK RIDGE

Proj: 110th Fighter Group  
MICH A.N.G.

Subm: 04-November-1994 Sampling

Sample: 1GW7 31-33

Submittal Number 32429- 4

Date Sampled: 11/04/94 Time: 14:30

Date Received: 11/04/94 Time: 16:40

Analysis Date: 11/08/94

Lab Sample No: 102126

Parameter	Result ug/l
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Acenaphthene	<5.0
Acenaphthylene	<5.0
Anthracene	<5.0
Benzo (a) Anthracene	<5.0
Benzo (b&k) Fluoranthene	<5.0
Benzo (a) Pyrene	<5.0
Benzo (g,h,i,) Perylene	<5.0
Chrysene	<5.0
Dibenzo (a,h) Anthracene	<5.0

Parameter	Result ug/l
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Fluoranthene	<5.0
Fluorene	<5.0
Indeno (1,2,3-cd) Pyrene	<5.0
Naphthalene	<5.0
Phenanthrene	<5.0
Pyrene	<5.0
1-Methylnaphthalene	<5.0
2-Methylnaphthalene	<5.0

PROJECT SPECIFIC FRACTION  
USEPA 8270

## EARTH TECH - OAK RIDGE

Proj: 110th Fighter Group  
MICH A.N.G.

Subm: 03-02 November-1994

Sample: IGW8 28-30

Submittal Number 32429- 2

Date Sampled: 11/02/94 Time: 17:30

Date Received: 11/03/94 Time: 07:30

Analysis Date: 11/08/94

Lab Sample No: 101923

Parameter	Result	Reporting Limit
	ug/l	ug/l
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Chrysene	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Fluoranthene	<5.0	5.0
Fluorene	<5.0	5.0
Indeno (1,2,3-cd) Pyrene	<5.0	5.0
Naphthalene	<5.0	5.0
Phenanthrene	<5.0	5.0
Pyrene	<5.0	5.0
1-Methylnaphthalene	<5.0	5.0
2-Methylnaphthalene	<5.0	5.0

PROJECT SPECIFIC FRACTION  
USEPA 8270

## EARTH TECH - OAK RIDGE

Proj: 110th Fighter Group  
MICH A.N.G.

Subm: 06-November-1994 Sampling

Sample: 1GW9 28-30

Submittal Number 32429- 5

Date Sampled: 11/04/94 Time: 16:45

Date Received: 11/07/94 Time: 08:45

Analysis Date: 11/09/94

Lab Sample No: 102197

Parameter	Result	Reporting Limit
	ug/l	ug/l
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Chrysene	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Fluoranthene	<5.0	5.0
Fluorene	<5.0	5.0
Indeno (1,2,3-cd) Pyrene	<5.0	5.0
Naphthalene	<5.0	5.0
Phenanthrene	<5.0	5.0
Pyrene	<5.0	5.0
1-Methylnaphthalene	<5.0	5.0
2-Methylnaphthalene	<5.0	5.0

PROJECT SPECIFIC FRACTION  
USEPA 8270

## EARTH TECH - OAK RIDGE

Proj: 110th Fighter Group

MICH A.N.G.

Subm: 15-December-1994 Sampling

Sample: 1GW102527

1GW102527

Submittal Number 32429- 9

Date Sampled: 12/15/94 Time: 10:15

Date Received: 12/20/94 Time: 10:30

Analysis Date: 01/06/95

Lab Sample No: 106561

Parameter	Result	Reporting Limit
	ug/l	ug/l
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Bis (2-Chloroethoxy) - Methane	<5.0	5.0
Bis (2-Chloroethyl) Ether	<5.0	5.0
Bis (2-Chloroisopropyl) - Ether	<5.0	5.0
Bis (2-ethylhexyl) - Phthalate	<5.0	5.0
4-Bromophenyl Phenylether	<5.0	5.0
Butyl Benzyl Phthalate	<5.0	5.0
4-Chloro-3-Methylphenol	<5.0	5.0
4-Chloroaniline	<20	20
2-Chloronaphthalene	<5.0	5.0
2-Chlorophenol	<5.0	5.0
4-Chlorophenylphenyl - Ether	<5.0	5.0
Chrysene	<5.0	5.0
Di-n-Butylphthalate	<5.0	5.0
Di-n-Octylphthalate	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Dibenzofuran	<5.0	5.0
3,3'-Dichlorobenzidine	<20	20
2,4-Dichlorophenol	<5.0	5.0
Diethylphthalate	<5.0	5.0
Dimethylphthalate	<5.0	5.0
2,4-Dimethylphenol	<5.0	5.0
4,6-Dinitro-2-Methylphenol	<20	20
2,4-Dinitrophenol	<20	20

PROJECT SPECIFIC FRACTION  
USEPA 8270

## EARTH TECH - OAK RIDGE

Proj: 110th Fighter Group

MICH A.N.G.

Subm: 15-December-1994 Sampling

Sample: 1GW102527

Submittal Number 32429- 9

Date Sampled: 12/15/94 Time: 10:15

Date Received: 12/20/94 Time: 10:30

Analysis Date: 01/06/95

Lab Sample No: 106561

1GW10 25-27

Parameter	Result	Reporting Limit
	ug/l	ug/l
2,4-Dinitrotoluene	<5.0	5.0
2,6-Dinitrotoluene	<5.0	5.0
Fluoranthene	<5.0	5.0
Fluorene	<5.0	5.0
Hexachlorobenzene	<5.0	5.0
Hexachlorobutadiene	<5.0	5.0
Hexachlorocyclopentadiene	<5.0	5.0
Hexachloroethane	<5.0	5.0
Indeno (1,2,3-cd) Pyrene	<5.0	5.0
Isophorone	<5.0	5.0
2-Methylnaphthalene	26	5.0
2-Methylphenol	<5.0	5.0
4-Methylphenol	<5.0	5.0
N-Nitrosodi-n-Propylamine	<5.0	5.0
N-Nitroso-di-Phenylamine	<5.0	5.0
Naphthalene	29	5.0
2-Nitroaniline	<20	20
3-Nitroaniline	<20	20
4-Nitroaniline	<20	20
Nitrobenzene	<5.0	5.0
2-Nitrophenol	<5.0	5.0
4-Nitrophenol	<20	20
Pentachlorophenol	<20	20
Phenanthrene	<5.0	5.0
Phenol	<5.0	5.0
Pyrene	<5.0	5.0
1,2,4-Trichlorobenzene	<5.0	5.0
2,4,5-Trichlorophenol	<50	50
2,4,6-Trichlorophenol	<5.0	5.0
1-Methylnaphthalene	60	5.0



PROJECT SPECIFIC FRACTION  
USEPA 8270

## EARTH TECH - OAK RIDGE

Proj: 110th Fighter Group  
MICH A.N.G.

Subm: 04-November-1994 Sampling

Sample: 1GW10 34-36

Submittal Number 32429- 4

Date Sampled: 11/04/94 Time: 09:30

Date Received: 11/04/94 Time: 16:40

Analysis Date: 11/08/94

Lab Sample No: 102124

Parameter	Result ug/l	Parameter	Result ug/l
Acenaphthene	<5.0	Fluoranthene	<5.0
Acenaphthylene	<5.0	Fluorene	<5.0
Anthracene	<5.0	Indeno (1,2,3-cd) Pyrene	<5.0
Benzo (a) Anthracene	<5.0	Naphthalene	<5.0
Benzo (b&k) Fluoranthene	<5.0	Phenanthrene	<5.0
Benzo (a) Pyrene	<5.0	Pyrene	<5.0
Benzo (g,h,i,) Perylene	<5.0	1-Methylnaphthalene	<5.0
Chrysene	<5.0	2-Methylnaphthalene	<5.0
Dibenzo (a,h) Anthracene	<5.0		

PROJECT SPECIFIC FRACTION  
USEPA 8270

## EARTH TECH - OAK RIDGE

Proj: 110th Fighter Group  
MICH A.N.G.

Subm: 04-November-1994 Sampling

Sample: 1GW11 27-28

Submittal Number 32429- 4

Date Sampled: 11/04/94 Time: 11:20

Date Received: 11/04/94 Time: 16:40

Analysis Date: 11/08/94

Lab Sample No: 102122

Parameter	Result ug/l
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Parameter	Result ug/l
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Acenaphthene	<5.0
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Fluoranthene	<5.0
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Acenaphthylene	<5.0
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Fluorene	<5.0
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Anthracene	<5.0
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Indeno (1,2,3-cd) Pyrene	<5.0
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Benzo (a) Anthracene	<5.0
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Naphthalene	<5.0
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Benzo (b&k) Fluoranthene	<5.0
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Phenanthrene	<5.0
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Benzo (a) Pyrene	<5.0
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Pyrene	<5.0
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Benzo (g,h,i,) Perylene	<5.0
-------------------------	------

1-Methylnaphthalene	<5.0
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Chrysene	<5.0
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2-Methylnaphthalene	<5.0
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Dibenzo (a,h) Anthracene	<5.0
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PROJECT SPECIFIC FRACTION  
USEPA 8270

## EARTH TECH - OAK RIDGE

Proj: 110th Fighter Group

MICH A.N.G.

Subm: 06-November-1994 Sampling

Sample: 1GW12 43-45

Submittal Number 32429- 5

Date Sampled: 11/06/94 Time: 09:00

Date Received: 11/07/94 Time: 08:45

Analysis Date: 11/09/94

Lab Sample No: 102195

Parameter	Result	Reporting Limit
	ug/l	ug/l
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Chrysene	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Fluoranthene	<5.0	5.0
Fluorene	<5.0	5.0
Indeno (1,2,3-cd) Pyrene	<5.0	5.0
Naphthalene	<5.0	5.0
Phenanthrene	<5.0	5.0
Pyrene	<5.0	5.0
1-Methylnaphthalene	5.0	5.0
2-Methylnaphthalene	7.0	5.0

PROJECT SPECIFIC FRACTION  
USEPA 8270

## EARTH TECH - OAK RIDGE

Proj: 110th Fighter Group

MICH A.N.G.

Subm: December 14, 1994 Samples

Sample: 1GW132527A

1GW13 25 27

Submittal Number 32429- 6

Date Sampled: 12/14/94 Time: 13:45

Date Received: 12/15/94 Time: 09:48

Analysis Date: 12/15/94

Lab Sample No: 106207

Parameter	Result ug/l
-----------	----------------

Acenaphthene	<5.0
--------------	------

Acenaphthylene	<5.0
----------------	------

Anthracene	<5.0
------------	------

Benzo (a) Anthracene	<5.0
----------------------	------

Benzo (b&k) Fluoranthene	<5.0
--------------------------	------

Benzo (a) Pyrene	<5.0
------------------	------

Benzo (g,h,i,) Perylene	<5.0
-------------------------	------

Chrysene	<5.0
----------	------

Dibenzo (a,h) Anthracene	<5.0
--------------------------	------

Parameter	Result ug/l
-----------	----------------

Fluoranthene	<5.0
--------------	------

Fluorene	<5.0
----------	------

Indeno (1,2,3-cd) Pyrene	<5.0
--------------------------	------

Naphthalene	<5.0
-------------	------

Phenanthrene	<5.0
--------------	------

Pyrene	<5.0
--------	------

1-Methylnaphthalene	21
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2-Methylnaphthalene	<5.0
---------------------	------

PROJECT SPECIFIC FRACTION  
USEPA 8270

## EARTH TECH - OAK RIDGE

Proj: 110th Fighter Group

MICH A.N.G.

Subm: December 14, 1994 Samples

Sample: 1GW133133B

Submittal Number 32429- 6

Date Sampled: 12/14/94 Time: 13:21

Date Received: 12/15/94 Time: 09:48

Analysis Date: 12/15/94

Lab Sample No: 106206

1GW13 31-33

Parameter	Result ug/l	Parameter	Result ug/l
Acenaphthene	<5.0	Fluoranthene	<5.0
Acenaphthylene	<5.0	Fluorene	<5.0
Anthracene	<5.0	Indeno (1,2,3-cd) Pyrene	<5.0
Benzo (a) Anthracene	<5.0	Naphthalene	<5.0
Benzo (b&k) Fluoranthene	<5.0	Phenanthrene	<5.0
Benzo (a) Pyrene	<5.0	Pyrene	<5.0
Benzo (g,h,i,) Perylene	<5.0	1-Methylnaphthalene	<5.0
Chrysene	<5.0	2-Methylnaphthalene	<5.0
Dibenzo (a,h) Anthracene	<5.0		

PROJECT SPECIFIC FRACTION  
USEPA 8270

## EARTH TECH - OAK RIDGE

Proj: 110th Fighter Group  
MICH A.N.G.

Subm: December 14, 1994 Samples

Sample: 1GW133840C

Submittal Number 32429- 6

Date Sampled: 12/14/94 Time: 11:35

Date Received: 12/15/94 Time: 09:48

Analysis Date: 12/15/94

Lab Sample No: 106205

1GW13 3840

Parameter	Result ug/l
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Parameter	Result ug/l
-----------	----------------

Acenaphthene	<5.0
--------------	------

Fluoranthene	<5.0
--------------	------

Acenaphthylene	<5.0
----------------	------

Fluorene	<5.0
----------	------

Anthracene	<5.0
------------	------

Indeno (1,2,3-cd) Pyrene	<5.0
--------------------------	------

Benzo (a) Anthracene	<5.0
----------------------	------

Naphthalene	<5.0
-------------	------

Benzo (b&k) Fluoranthene	<5.0
--------------------------	------

Phenanthrene	<5.0
--------------	------

Benzo (a) Pyrene	<5.0
------------------	------

Pyrene	<5.0
--------	------

Benzo (g,h,i,) Perylene	<5.0
-------------------------	------

1-Methylnaphthalene	<5.0
---------------------	------

Chrysene	<5.0
----------	------

2-Methylnaphthalene	<5.0
---------------------	------

Dibenzo (a,h) Anthracene	<5.0
--------------------------	------

PROJECT SPECIFIC FRACTION  
USEPA 8270

## EARTH TECH - OAK RIDGE

Proj: 110th Fighter Group

MICH A.N.G.

Subm: 15-December-1994 Sampling

Sample: 1GW14

Submittal Number 32429- 9

Date Sampled: 12/15/94 Time: 14:55

Date Received: 12/20/94 Time: 10:30

Analysis Date: 01/06/95

Lab Sample No: 106562

Parameter	Result	Reporting Limit
	ug/l	ug/l
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Bis (2-Chloroethoxy) - Methane	<5.0	5.0
Bis (2-Chloroethyl) Ether	<5.0	5.0
Bis (2-Chloroisopropyl) - Ether	<5.0	5.0
Bis (2-ethylhexyl) - Phthalate	<5.0	5.0
4-Bromophenyl Phenylether	<5.0	5.0
Butyl Benzyl Phthalate	<5.0	5.0
4-Chloro-3-Methylphenol	<5.0	5.0
4-Chloroaniline	<20	20
2-Chloronaphthalene	<5.0	5.0
2-Chlorophenol	<5.0	5.0
4-Chlorophenylphenyl- Ether	<5.0	5.0
Chrysene	<5.0	5.0
Di-n-Butylphthalate	<5.0	5.0
Di-n-Octylphthalate	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Dibenzofuran	<5.0	5.0
3,3'-Dichlorobenzidine	<20	20
2,4-Dichlorophenol	<5.0	5.0
Diethylphthalate	<5.0	5.0
Dimethylphthalate	<5.0	5.0
2,4-Dimethylphenol	<5.0	5.0
4,6-Dinitro-	<20	20
2-Methylphenol		
2,4-Dinitrophenol	<20	20

PROJECT SPECIFIC FRACTION  
USEPA 8270

## EARTH TECH - OAK RIDGE

Proj: 110th Fighter Group

MICH A.N.G.

Subm: 15-December-1994 Sampling

Sample: 1GW14

Submittal Number 32429- 9

Date Sampled: 12/15/94 Time: 14:55

Date Received: 12/20/94 Time: 10:30

Analysis Date: 01/06/95

Lab Sample No: 106562

Parameter	Result	Reporting Limit
	ug/l	ug/l
2,4-Dinitrotoluene	<5.0	5.0
2,6-Dinitrotoluene	<5.0	5.0
Fluoranthene	<5.0	5.0
Fluorene	<5.0	5.0
Hexachlorobenzene	<5.0	5.0
Hexachlorobutadiene	<5.0	5.0
Hexachlorocyclopentadiene	<5.0	5.0
Hexachloroethane	<5.0	5.0
Indeno (1,2,3-cd) Pyrene	<5.0	5.0
Isophorone	<5.0	5.0
2-Methylnaphthalene	<5.0	5.0
2-Methylphenol	<5.0	5.0
4-Methylphenol	<5.0	5.0
N-Nitrosodi-n-Propylamine	<5.0	5.0
N-Nitroso-di-Phenylamine	<5.0	5.0
Naphthalene	<5.0	5.0
2-Nitroaniline	<20	20
3-Nitroaniline	<20	20
4-Nitroaniline	<20	20
Nitrobenzene	<5.0	5.0
2-Nitrophenol	<5.0	5.0
4-Nitrophenol	<20	20
Pentachlorophenol	<20	20
Phenanthrene	<5.0	5.0
Phenol	<5.0	5.0
Pyrene	<5.0	5.0
1,2,4-Trichlorobenzene	<5.0	5.0
2,4,5-Trichlorophenol	<50	50
2,4,6-Trichlorophenol	<5.0	5.0
1-Methylnaphthalene	<5.0	5.0



PROJECT SPECIFIC FRACTION  
USEPA 8270

## EARTH TECH - OAK RIDGE

Proj: 110th Fighter Group

MICH A.N.G.

Subm: 15-December-1994 Sampling

Sample: 1GW14D

Submittal Number 32429- 9

Date Sampled: 12/15/94 Time: 14:55

Date Received: 12/20/94 Time: 10:30

Analysis Date: 01/06/95

Lab Sample No: 106563

*Duplicate*

Parameter	Result	Reporting Limit
	ug/l	ug/l
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Bis (2-Chloroethoxy) - Methane	<5.0	5.0
Bis (2-Chloroethyl) Ether	<5.0	5.0
Bis (2-Chloroisopropyl) - Ether	<5.0	5.0
Bis (2-ethylhexyl) - Phthalate	<5.0	5.0
4-Bromophenyl Phenylether	<5.0	5.0
Butyl Benzyl Phthalate	<5.0	5.0
4-Chloro-3-Methylphenol	<5.0	5.0
4-Chloroaniline	<20	20
2-Chloronaphthalene	<5.0	5.0
2-Chlorophenol	<5.0	5.0
4-Chlorophenylphenyl - Ether	<5.0	5.0
Chrysene	<5.0	5.0
Di-n-Butylphthalate	<5.0	5.0
Di-n-Octylphthalate	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Dibenzofuran	<5.0	5.0
3,3'-Dichlorobenzidine	<20	20
2,4-Dichlorophenol	<5.0	5.0
Diethylphthalate	<5.0	5.0
Dimethylphthalate	<5.0	5.0
2,4-Dimethylphenol	<5.0	5.0
4,6-Dinitro -	<20	20
2-Methylphenol		
2,4-Dinitrophenol	<20	20

PROJECT SPECIFIC FRACTION  
USEPA 8270

## EARTH TECH - OAK RIDGE

Proj: 110th Fighter Group  
MICH A.N.G.

Subm: 15-December-1994 Sampling

Sample: 1GW14D

Submittal Number 32429- 9

Date Sampled: 12/15/94 Time: 14:55

Date Received: 12/20/94 Time: 10:30

Analysis Date: 01/06/95

Lab Sample No: 106563

Parameter	Result	Reporting Limit
	ug/l	ug/l
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Bis (2-Chloroethoxy) - Methane	<5.0	5.0
Bis (2-Chloroethyl) Ether	<5.0	5.0
Bis (2-Chloroisopropyl) - Ether	<5.0	5.0
Bis (2-ethylhexyl) - Phthalate	<5.0	5.0
4-Bromophenyl Phenylether	<5.0	5.0
Butyl Benzyl Phthalate	<5.0	5.0
4-Chloro-3-Methylphenol	<5.0	5.0
4-Chloroaniline	<20	20
2-Chloronaphthalene	<5.0	5.0
2-Chlorophenol	<5.0	5.0
4-Chlorophenylphenyl - Ether	<5.0	5.0
Chrysene	<5.0	5.0
Di-n-Butylphthalate	<5.0	5.0
Di-n-Octylphthalate	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Dibenzofuran	<5.0	5.0
3,3'-Dichlorobenzidine	<20	20
2,4-Dichlorophenol	<5.0	5.0
Diethylphthalate	<5.0	5.0
Dimethylphthalate	<5.0	5.0
2,4-Dimethylphenol	<5.0	5.0
4,6-Dinitro-2-Methylphenol	<20	20
2,4-Dinitrophenol	<20	20

PROJECT SPECIFIC FRACTION  
USEPA 8270

## EARTH TECH - OAK RIDGE

Proj: 110th Fighter Group

MICH A.N.G.

Subm: 15-December-1994 Sampling

Sample: BC1TMW3 32-37

Submittal Number 32429- 9

Date Sampled: 12/15/94 Time: 15:55

Date Received: 12/20/94 Time: 10:30

Analysis Date: 01/06/95

Lab Sample No: 106565

Parameter	Result	Reporting Limit
	ug/l	ug/l
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Bis (2-Chloroethoxy) - Methane	<5.0	5.0
Bis (2-Chloroethyl) Ether	<5.0	5.0
Bis (2-Chloroisopropyl) - Ether	<5.0	5.0
Bis (2-ethylhexyl) - Phthalate	<5.0	5.0
4-Bromophenyl Phenylether	<5.0	5.0
Butyl Benzyl Phthalate	<5.0	5.0
4-Chloro-3-Methylphenol	<5.0	5.0
4-Chloroaniline	<20	20
2-Chloronaphthalene	<5.0	5.0
2-Chlorophenol	<5.0	5.0
4-Chlorophenylphenyl- Ether	<5.0	5.0
Chrysene	<5.0	5.0
Di-n-Butylphthalate	<5.0	5.0
Di-n-Octylphthalate	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Dibenzofuran	<5.0	5.0
3,3'-Dichlorobenzidine	<20	20
2,4-Dichlorophenol	<5.0	5.0
Diethylphthalate	<5.0	5.0
Dimethylphthalate	<5.0	5.0
2,4-Dimethylphenol	<5.0	5.0
4,6-Dinitro- 2-Methylphenol	<20	20
2,4-Dinitrophenol	<20	20

PROJECT SPECIFIC FRACTION  
USEPA 8270

## EARTH TECH - OAK RIDGE

Proj: 110th Fighter Group  
MICH A.N.G.Subm: 15-December-1994 Sampling  
Sample: BC1TMW3

Submittal Number 32429- 9

Date Sampled: 12/15/94 Time: 15:55

Date Received: 12/20/94 Time: 10:30

Analysis Date: 01/06/95

Lab Sample No: 106565

Parameter	Result	Reporting Limit
	ug/l	ug/l
2,4-Dinitrotoluene	<5.0	5.0
2,6-Dinitrotoluene	<5.0	5.0
Fluoranthene	<5.0	5.0
Fluorene	<5.0	5.0
Hexachlorobenzene	<5.0	5.0
Hexachlorobutadiene	<5.0	5.0
Hexachlorocyclopentadiene	<5.0	5.0
Hexachloroethane	<5.0	5.0
Indeno (1,2,3-cd) Pyrene	<5.0	5.0
Isophorone	<5.0	5.0
2-Methylnaphthalene	<5.0	5.0
2-Methylphenol	<5.0	5.0
4-Methylphenol	<5.0	5.0
N-Nitrosodi-n-Propylamine	<5.0	5.0
N-Nitroso-di-Phenylamine	<5.0	5.0
Naphthalene	<5.0	5.0
2-Nitroaniline	<20	20
3-Nitroaniline	<20	20
4-Nitroaniline	<20	20
Nitrobenzene	<5.0	5.0
2-Nitrophenol	<5.0	5.0
4-Nitrophenol	<20	20
Pentachlorophenol	<20	20
Phenanthrene	<5.0	5.0
Phenol	<5.0	5.0
Pyrene	<5.0	5.0
1,2,4-Trichlorobenzene	<5.0	5.0
2,4,5-Trichlorophenol	<50	50
2,4,6-Trichlorophenol	<5.0	5.0
1-Methylnaphthalene	<5.0	5.0

PROJECT SPECIFIC FRACTION  
USEPA 8270

## EARTH TECH - OAK RIDGE

Proj: 110th Fighter Group

MICH A.N.G.

Subm: 06-November-1994 Sampling

Sample: BC2MW1

Submittal Number 32429- 5

Date Sampled: 11/04/94 Time: 17:00

Date Received: 11/07/94 Time: 08:45

Analysis Date: 11/09/94

Lab Sample No: 102196

Parameter	Result	Reporting Limit
	ug/l	ug/l
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Chrysene	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Fluoranthene	<5.0	5.0
Fluorene	<5.0	5.0
Indeno (1,2,3-cd) Pyrene	<5.0	5.0
Naphthalene	6.0	5.0
Phenanthrene	<5.0	5.0
Pyrene	<5.0	5.0
1-Methylnaphthalene	7.0	5.0
2-Methylnaphthalene	7.0	5.0

## BATTLE CREEK ANG VOA'S

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: BCFB1

Submittal Number 32565- 1  
Date Sampled: 11/02/94 Time: 00:00  
Date Received: 11/02/94 Time: 16:45  
Analysis Date: 11/03/94  
Lab Sample No: 101822

Parameter	Result ug/l.	Parameter	Result ug/l
Benzene	<1.0	Tetrachloroethene	<1.0
cis-1,2-Dichloroethylene	<1.0	Toluene	1.9
trans-1,2-Dichloroethene	<1.0	Trichloroethylene	<1.0
Ethylbenzene	<1.0	Xylene, Total	*<50

\* See attached Statement of Data Qualifications.

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## BATTLE CREEK ANG VOA'S

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: BCFB2

Submittal Number 32565- 1  
Date Sampled: 11/02/94 Time: 15:00  
Date Received: 11/02/94 Time: 16:45  
Analysis Date: 11/02/94  
Lab Sample No: 101820

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	*<1.0	Tetrachloroethene	<1.0
cis-1,2-Dichloroethylene	<1.0	Toluene	*<1.0
trans-1,2-Dichloroethene	<1.0	Trichloroethylene	<1.0
Ethylbenzene	<1.0	Xylene, Total	<3.0

\* See attached Statement of Data Qualifications.

## BATTLE CREEK ANG VOA'S

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: BCER1

Submittal Number 32565- 1  
Date Sampled: 11/03/94 Time: 07:30  
Date Received: 11/03/94 Time: 14:30  
Analysis Date: 11/03/94  
Lab Sample No: 101894

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	<1.0	Tetrachloroethene	<1.0
cis-1,2-Dichloroethylene	<1.0	Toluene	2.0
trans-1,2-Dichloroethene	<1.0	Trichloroethylene	<1.0
Ethylbenzene	<1.0	Xylene, Total	<3.0



BATTLE CREEK ANG VOA'S

EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
 ANG- Battle Creek  
 Subm: November 2, 1994 sampling  
 Sample: BCER2

Submittal Number 32565- 1  
 Date Sampled: 11/04/94 Time: 10:45  
 Date Received: 11/04/94 Time: 16:40  
 Analysis Date: 11/04/94  
 Lab Sample No: 102118

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	<1.0	Tetrachloroethene	<1.0
cis-1,2-Dichloroethylene	<1.0	Toluene	* 1.5
trans-1,2-Dichloroethene	<1.0	Trichloroethylene	<1.0
Ethylbenzene	<1.0	Xylene, Total	<3.0

\* See attached Statement of Data Qualifications.

PROJECT SPECIFIC FRACTION  
USEPA 8270

## EARTH TECH - OAK RIDGE

Proj: 110th Fighter Group  
MICH A.N.G.  
Subm: 03-02 November-1994  
Sample: BCER1

Submittal Number 32429- 2  
Date Sampled: 11/03/94 Time: 07:30  
Date Received: 11/03/94 Time: 14:30  
Analysis Date: 11/09/94  
Lab Sample No: 101925

Parameter	Result	Reporting Limit
	ug/l	ug/l
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Chrysene	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Fluoranthene	<5.0	5.0
Fluorene	<5.0	5.0
Indeno (1,2,3-cd) Pyrene	<5.0	5.0
Naphthalene	<5.0	5.0
Phenanthrene	<5.0	5.0
Pyrene	<5.0	5.0
1-Methylnaphthalene	<5.0	5.0
2-Methylnaphthalene	<5.0	5.0

PROJECT SPECIFIC FRACTION  
USEPA 8270

## EARTH TECH - OAK RIDGE

Proj: 110th Fighter Group

MICH A.N.G.

Subm: 04-November-1994 Sampling

Sample: BCER2

Submittal Number 32429- 4

Date Sampled: 11/04/94 Time: 10:45

Date Received: 11/04/94 Time: 16:40

Analysis Date: 11/08/94

Lab Sample No: 102123

Parameter	Result ug/l	Parameter	Result ug/l
Acenaphthene	<5.0	Fluoranthene	<5.0
Acenaphthylene	<5.0	Fluorene	<5.0
Anthracene	<5.0	Indeno (1,2,3-cd) Pyrene	<5.0
Benzo (a) Anthracene	<5.0	Naphthalene	<5.0
Benzo (b&k) Fluoranthene	<5.0	Phenanthrene	<5.0
Benzo (a) Pyrene	<5.0	Pyrene	<5.0
Benzo (g,h,i,) Perylene	<5.0	1-Methylnaphthalene	<5.0
Chrysene	<5.0	2-Methylnaphthalene	<5.0
Dibenzo (a,h) Anthracene	<5.0		

LABORATORY TESTS RESULTS  
01/10/95

OB NUMBER: 114420

CUSTOMER: Earth Tech

ATTN: Carol Smith

CLIENT I.D.: BCERO1121594 (106575)

LABORATORY I.D.: 114420-0007

DATE SAMPLED: 12/15/94

DATE RECEIVED: 12/27/94

TIME SAMPLED: 13:00

TIME RECEIVED: 15:00

WORK DESCRIPTION: Project ID: 110FG, MIANG

REMARKS: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics in Water		*1		USEPA 8260	12/29/94	RDC
Dichlorodifluoromethane	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Trichlorofluoromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
Methylene chloride	1.3	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
2,2-Dichloropropane	ND	1.0	ug/l			
cis-1,2-Dichloroethene	ND	1.0	ug/l			
Chloroform	3.0	1.0	ug/l			
Bromochloromethane	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
1,1-Dichloropropene	ND	1.0	ug/l			
Benzene	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Dibromomethane	ND	1.0	ug/l			
Toluene	1.2	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Tetrachloroethene	ND	1.0	ug/l			
1,3-Dichloropropane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,2-Dibromoethane	ND	1.0	ug/l			
1-Chlorohexane	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
1,1,1,2-Tetrachloroethane	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
Styrene	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Isopropylbenzene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Bromobenzene	ND	1.0	ug/l			
1,2,3-Trichloropropane	ND	1.0	ug/l			
N-propylbenzene	ND	1.0	ug/l			
2-Chlorotoluene	ND	1.0	ug/l			
1,3,5-Trimethylbenzene	ND	1.0	ug/l			
4-Chlorotoluene	ND	1.0	ug/l			

12649 Richfield Court  
Livonia, MI 48150  
(313) 462-3900

LABORATORY TESTS RESULTS  
01/10/95

JOB NUMBER: 114420

CUSTOMER: Earth Tech

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LABORATORY I.D.: 114420-0007

DATE RECEIVED: 12/27/94

TIME RECEIVED: 15:00

REMARKS: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
t-butylbenzene	ND	1.0	ug/l			
1,2,4-Trimethylbenzene	ND	1.0	ug/l			
s-butylbenzene	ND	1.0	ug/l			
p-Isopropyltoluene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
n-butylbenzene	ND	1.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,2-Dibromo-3-chloropropane	ND	1.0	ug/l			
1,2,4-Trichlorobenzene	ND	1.0	ug/l			
Hexachlorobutadiene	ND	1.0	ug/l			
Naphthalene	ND	1.0	ug/l			
1,2,3-Trichlorobenzene	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	98	0	%	86-115 %		
1,2-Dichloroethane-d4	98	0	%	70-121 %		
Toluene-d8	100	0	%	88-110 %		
Date Analyzed:	12/29/94	0	Month/Day/Year			

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PROJECT SPECIFIC FRACTION  
USEPA 8270

## EARTH TECH - OAK RIDGE

Proj: 110th Fighter Group

MICH A.N.G.

Subm: 15-December-1994 Sampling

Sample: BCERO  
1121594

Submittal Number 32429- 9

Date Sampled: 12/15/94 Time: 13:00

Date Received: 12/20/94 Time: 10:30

Analysis Date: 01/06/95

Lab Sample No: 106564

Parameter	Result	Reporting Limit
	ug/l	ug/l
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Bis (2-Chloroethoxy) - Methane	<5.0	5.0
Bis (2-Chloroethyl) Ether	<5.0	5.0
Bis (2-Chloroisopropyl) - Ether	<5.0	5.0
Bis (2-ethylhexyl) - Phthalate	<5.0	5.0
4-Bromophenyl Phenylether	<5.0	5.0
Butyl Benzyl Phthalate	<5.0	5.0
4-Chloro-3-Methylphenol	<5.0	5.0
4-Chloroaniline	<20	20
2-Chloronaphthalene	<5.0	5.0
2-Chlorophenol	<5.0	5.0
4-Chlorophenylphenyl- Ether	<5.0	5.0
Chrysene	<5.0	5.0
Di-n-Butylphthalate	<5.0	5.0
Di-n-Octylphthalate	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Dibenzofuran	<5.0	5.0
3,3'-Dichlorobenzidine	<20	20
2,4-Dichlorophenol	<5.0	5.0
Diethylphthalate	<5.0	5.0
Dimethylphthalate	<5.0	5.0
2,4-Dimethylphenol	<5.0	5.0
4,6-Dinitro- 2-Methylphenol	<20	20
2,4-Dinitrophenol	<20	20

PROJECT SPECIFIC FRACTION  
USEPA 8270

## EARTH TECH - OAK RIDGE

Proj: 110th Fighter Group

MICH A.N.G.

Subm: 15-December-1994 Sampling

Sample: BCERO  
1121594

Submittal Number 32429- 9

Date Sampled: 12/15/94 Time: 13:00

Date Received: 12/20/94 Time: 10:30

Analysis Date: 01/06/95

Lab Sample No: 106564

Parameter	Result	Reporting Limit
	ug/l	ug/l
2,4-Dinitrotoluene	<5.0	5.0
2,6-Dinitrotoluene	<5.0	5.0
Fluoranthene	<5.0	5.0
Fluorene	<5.0	5.0
Hexachlorobenzene	<5.0	5.0
Hexachlorobutadiene	<5.0	5.0
Hexachlorocyclopentadiene	<5.0	5.0
Hexachloroethane	<5.0	5.0
Indeno (1,2,3-cd) Pyrene	<5.0	5.0
Isophorone	<5.0	5.0
2-Methylnaphthalene	<5.0	5.0
2-Methylphenol	<5.0	5.0
4-Methylphenol	<5.0	5.0
N-Nitrosodi-n-Propylamine	<5.0	5.0
N-Nitroso-di-Phenylamine	<5.0	5.0
Naphthalene	<5.0	5.0
2-Nitroaniline	<20	20
3-Nitroaniline	<20	20
4-Nitroaniline	<20	20
Nitrobenzene	<5.0	5.0
2-Nitrophenol	<5.0	5.0
4-Nitrophenol	<20	20
Pentachlorophenol	<20	20
Phenanthrene	<5.0	5.0
Phenol	<5.0	5.0
Pyrene	<5.0	5.0
1,2,4-Trichlorobenzene	<5.0	5.0
2,4,5-Trichlorophenol	<50	50
2,4,6-Trichlorophenol	<5.0	5.0
1-Methylnaphthalene	<5.0	5.0

# PAH RESULTS FOR BC ANGB

*analyzed 12-19-94*

*analyzed 12-20-94*

Sample ID	Result	Units
BCBGSS01	<1.0	mg/kg
BCBGSS02	<1.0	mg/kg
BCBGSS03	>>1.0	mg/kg
BCBGSS03D	>>1.0	mg/kg
BCBGSS04	>>1.0	mg/kg
BCBGSS05	<1.0	mg/kg
BCBGSS06	<1.0	mg/kg
BCBGSS06D	<1.0	mg/kg
BCBGSS07	>>1.0	mg/kg
BCBGSS08	>>1.0	mg/kg
BCBG1 0507	<1.0	mg/kg
BCBG2 0507	<1.0	mg/kg
BCBG3 0507	<1.0	mg/kg
BCBG4 0507	<1.0	mg/kg

Sample ID	Result	Units
BC1MW2 0507	<0.2	mg/kg
BC1MW2 1012	<0.2	mg/kg
BC1MW2 1517	<0.2	mg/kg
BC1MW2 2022	<0.2	mg/kg
BC1SS05	>5.0	mg/kg
BC1SS06	3.7	mg/kg
BC1SS07	>50	mg/kg
BC1SS08	31	mg/kg
BC1SS09	4.3	mg/kg
BC1SS09D	4.7	mg/kg
BC1SS10	460	mg/kg
BC1SS11	<0.2	mg/kg
BC1SS12	<0.2	mg/kg
BC1SS13	<0.2	mg/kg
BC1SS14	0.66	mg/kg
BC1SS15	4.6	mg/kg



## BATTLE CREEK ANG VOA SOIL

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1B20507

Submittal Number 32565- 1  
Date Sampled: 11/06/94 Time: 11:30  
Date Received: 11/07/94 Time: 08:45  
Analysis Date: 11/06/94  
Lab Sample No: 102134

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

## BATTLE CRREK ANG VOA SOIL

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1B21012

Submittal Number 32565- 1  
Date Sampled: 11/06/94 Time: 11:40  
Date Received: 11/07/94 Time: 08:45  
Analysis Date: 11/07/94  
Lab Sample No: 102135

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

BATTLE CRREK ANG VOA SOIL

**EARTH TECH - OAK RIDGE**

Proj: Field Analysis Michigan  
 ANG- Battle Creek  
 Subm: November 2,1994 sampling  
 Sample: 1B21517

Submittal Number 32565- 1  
 Date Sampled: 11/06/94 Time: 11:50  
 Date Received: 11/07/94 Time: 08:45  
 Analysis Date: 11/07/94  
 Lab Sample No: 102136

Parameter	Result mg/kg
Benzene	<0.010
cis-1,2-Dichloroethylene	<0.010
trans-1,2-Dichloroethene	<0.010
Ethylbenzene	0.024

Parameter	Result mg/kg
Tetrachloroethene	<0.010
Toluene	<0.010
Trichloroethylene	<0.010
Xylene, Total	0.23

## BATTLE CRREK ANG VOA SOIL

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1B22022

Submittal Number 32565- 1  
Date Sampled: 11/06/94 Time: 12:00  
Date Received: 11/07/94 Time: 08:45  
Analysis Date: 11/07/94  
Lab Sample No: 102137

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	0.18	Xylene, Total	1.1

BATTLE CRREK ANG VOA SOIL

**EARTH TECH - OAK RIDGE**

Proj: Field Analysis Michigan  
 ANG- Battle Creek  
 Subm: November 2,1994 sampling  
 Sample: 1B10507

Submittal Number 32565- 1  
 Date Sampled: 11/06/94 Time: 13:20  
 Date Received: 11/07/94 Time: 08:45  
 Analysis Date: 11/07/94  
 Lab Sample No: 102138

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	0.017	Xylene, Total	0.083

## BATTLE CRREK ANG VOA SOIL

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1B11012

Submittal Number 32565- 1  
Date Sampled: 11/06/94 Time: 13:50  
Date Received: 11/07/94 Time: 08:45  
Analysis Date: 11/07/94  
Lab Sample No: 102139

Parameter	Result mg/kg
Benzene	<0.010
cis-1,2-Dichloroethylene	<0.010
trans-1,2-Dichloroethene	<0.010
Ethylbenzene	<0.010

Parameter	Result mg/kg
Tetrachloroethene	<0.010
Toluene	<0.010
Trichloroethylene	<0.010
Xylene, Total	<0.030

## BATTLE CRREK ANG VOA SOIL

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1B11517

Submittal Number 32565- 1  
Date Sampled: 11/06/94 Time: 14:10  
Date Received: 11/07/94 Time: 08:45  
Analysis Date: 11/07/94  
Lab Sample No: 102140

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

## BATTLE CRREK ANG VOA SOIL

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1B12022

Submittal Number 32565- 1  
Date Sampled: 11/06/94 Time: 14:38  
Date Received: 11/07/94 Time: 08:45  
Analysis Date: 11/07/94  
Lab Sample No: 102141

Parameter	Result mg/kg
Benzene	<0.010
cis-1,2-Dichloroethylene	<0.010
trans-1,2-Dichloroethene	<0.010
Ethylbenzene	<0.010

Parameter	Result mg/kg
Tetrachloroethene	<0.010
Toluene	<0.010
Trichloroethylene	<0.010
Xylene, Total	<0.030



BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
 ANG- Battle Creek  
 Subm: November 2,1994 sampling  
 Sample: 1B40507

Submittal Number 32565- 1  
 Date Sampled: 11/06/94 Time: 15:35  
 Date Received: 11/07/94 Time: 08:45  
 Analysis Date: 11/08/94  
 Lab Sample No: 102142

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

## BATTLE CRREK ANG VOA SOIL

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1B41012

Submittal Number 32565- 1  
Date Sampled: 11/06/94 Time: 15:45  
Date Received: 11/07/94 Time: 08:45  
Analysis Date: 11/07/94  
Lab Sample No: 102143

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

## BATTLE CRREK ANG VOA SOIL

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1B41012D

Submittal Number 32565- 1  
Date Sampled: 11/06/94 Time: 15:45  
Date Received: 11/07/94 Time: 08:45  
Analysis Date: 11/07/94  
Lab Sample No: 102144

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030



## BATTLE CRREK ANG VOA SOIL

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1B41517

Submittal Number 32565- 1  
Date Sampled: 11/06/94 Time: 16:10  
Date Received: 11/07/94 Time: 08:45  
Analysis Date: 11/07/94  
Lab Sample No: 102145

## Parameter

Result  
mg/kg

## Parameter

Result  
mg/kg

Benzene <0.010  
cis-1,2-Dichloroethylene <0.010  
trans-1,2-Dichloroethylene <0.010  
Ethylbenzene <0.010

Tetrachloroethene <0.010  
Toluene <0.010  
Trichloroethylene <0.010  
Xylene, Total <0.030



## BATTLE CRREK ANG VOA SOIL

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan

ANG- Battle Creek

Subm: November 2, 1994 sampling

Sample: 1B12527

Submittal Number 32565- 1

Date Sampled: 11/06/94 Time: 14:55

Date Received: 11/07/94 Time: 08:45

Analysis Date: 11/08/94

Lab Sample No: 102146

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

## BATTLE CRREK ANG VOA SOIL

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek

Subm: November 2, 1994 sampling  
Sample: 1B12527D

Submittal Number 32565- 1

Date Sampled: 11/06/94 Time: 14:55

Date Received: 11/07/94 Time: 08:45

Analysis Date: 11/08/94

Lab Sample No: 102147

Parameter	Result mg/kg
Benzene	<0.010
cis-1,2-Dichloroethylene	<0.010
trans-1,2-Dichloroethene	<0.010
Ethylbenzene	<0.010

Parameter	Result mg/kg
Tetrachloroethene	<0.010
Toluene	<0.010
Trichloroethylene	<0.010
Xylene, Total	<0.030



## BATTLE CREEK ANG VOA'S

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek

Subm: November 2, 1994 sampling  
Sample: BCER3

Submittal Number 32565- 1

Date Sampled: 11/06/94 Time: 14:50

Date Received: 11/07/94 Time: 08:45

Analysis Date: 11/06/94

Lab Sample No: 102148

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	<1.0	Tetrachloroethene	<1.0
cis-1,2-Dichloroethylene	<1.0	Toluene	<1.0
trans-1,2-Dichloroethene	<1.0	Trichloroethylene	<1.0
Ethylbenzene	<1.0	Xylene, Total	<3.0

## BATTLE CRREK ANG VOA SOIL

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1B80507

Submittal Number 32565- 1  
Date Sampled: 11/07/94 Time: 15:15  
Date Received: 11/08/94 Time: 08:25  
Analysis Date: 11/08/94  
Lab Sample No: 102300

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030



## BATTLE CRREK ANG VOA SOIL

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan

ANG- Battle Creek

Subm: November 2, 1994 sampling

Sample: 1B30001

Submittal Number 32565- 1

Date Sampled: 11/07/94 Time: 10:35

Date Received: 11/08/94 Time: 08:25

Analysis Date: 11/08/94

Lab Sample No: 102301

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

## BATTLE CRREK ANG VOA SOIL

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1B51012

Submittal Number 32565- 1  
Date Sampled: 11/07/94 Time: 10:50  
Date Received: 11/08/94 Time: 08:25  
Analysis Date: 11/08/94  
Lab Sample No: 102302

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

## BATTLE CREEK ANG VOA SOIL

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1B52527D

Submittal Number 32565- 1  
Date Sampled: 11/07/94 Time: 12:10  
Date Received: 11/08/94 Time: 08:25  
Analysis Date: 11/09/94  
Lab Sample No: 102303

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	*<0.11

\* See attached Statement of Data Qualifications.

## BATTLE CRREK ANG VOA SOIL

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1B2001

Submittal Number 32565- 1  
Date Sampled: 11/07/94 Time: 09:00  
Date Received: 11/08/94 Time: 08:25  
Analysis Date: 11/08/94  
Lab Sample No: 102304

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

## BATTLE CRREK ANG VOA SOIL

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1B50507

Submittal Number 32565- 1  
Date Sampled: 11/07/94 Time: 10:15  
Date Received: 11/08/94 Time: 08:25  
Analysis Date: 11/08/94  
Lab Sample No: 102305

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

## BATTLE CREEK ANG VOA SOIL

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1B120507

Submittal Number 32565- 1  
Date Sampled: 11/07/94 Time: 13:35  
Date Received: 11/08/94 Time: 08:25  
Analysis Date: 11/08/94  
Lab Sample No: 102306

Parameter	Result mg/kg
Benzene	<0.010
cis-1,2-Dichloroethylene	<0.010
trans-1,2-Dichloroethene	<0.010
Ethylbenzene	<0.010

Parameter	Result mg/kg
Tetrachloroethene	<0.010
Toluene	<0.010
Trichloroethylene	<0.010
Xylene, Total	<0.030

## BATTLE CRREK ANG VOA SOIL

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1B10001

Submittal Number 32565- 1  
Date Sampled: 11/07/94 Time: 09:30  
Date Received: 11/08/94 Time: 08:25  
Analysis Date: 11/09/94  
Lab Sample No: 102307

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

## BATTLE CRREK ANG VOA SOIL

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1B121517

Submittal Number 32565- 1  
Date Sampled: 11/07/94 Time: 14:30  
Date Received: 11/08/94 Time: 08:25  
Analysis Date: 11/08/94  
Lab Sample No: 102308

Parameter	Result mg/kg
Benzene	<0.010
cis-1,2-Dichloroethylene	<0.010
trans-1,2-Dichloroethene	<0.010
Ethylbenzene	<0.010

Parameter	Result mg/kg
Tetrachloroethene	<0.010
Toluene	<0.010
Trichloroethylene	<0.010
Xylene, Total	<0.030



## BATTLE CRREK ANG VOA SOIL

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1B82022

Submittal Number 32565- 1  
Date Sampled: 11/07/94 Time: 16:10  
Date Received: 11/08/94 Time: 08:25  
Analysis Date: 11/08/94  
Lab Sample No: 102309

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

## BATTLE CREEK ANG VOA SOIL

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1B81517

Submittal Number 32565- 1  
Date Sampled: 11/07/94 Time: 15:50  
Date Received: 11/08/94 Time: 08:25  
Analysis Date: 11/08/94  
Lab Sample No: 102310

## Parameter

Result  
mg/kg

## Parameter

Result  
mg/kg

Benzene <0.010  
cis-1,2-Dichloroethylene <0.010  
trans-1,2-Dichloroethylene <0.010  
Ethylbenzene <0.010

Tetrachloroethene <0.010  
Toluene <0.010  
Trichloroethylene <0.010  
Xylene, Total <0.030

## BATTLE CRREK ANG VOA SOIL

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1B122022

Submittal Number 32565- 1  
Date Sampled: 11/07/94 Time: 14:45  
Date Received: 11/08/94 Time: 08:25  
Analysis Date: 11/08/94  
Lab Sample No: 102311

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

## BATTLE CREEK ANG VOA SOIL

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1B52527

Submittal Number 32565- 1  
Date Sampled: 11/07/94 Time: 12:10  
Date Received: 11/08/94 Time: 08:25  
Analysis Date: 11/09/94  
Lab Sample No: 102312

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	*<0.060

\* See attached Statement of Data Qualifications.

## BATTLE CRREK ANG VOA SOIL

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1B52022

Submittal Number 32565- 1  
Date Sampled: 11/07/94 Time: 11:40  
Date Received: 11/08/94 Time: 08:25  
Analysis Date: 11/08/94  
Lab Sample No: 102313

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030



## BATTLE CRREK ANG VOA SOIL

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1B81012

Submittal Number 32565- 1  
Date Sampled: 11/07/94 Time: 15:35  
Date Received: 11/08/94 Time: 08:25  
Analysis Date: 11/09/94  
Lab Sample No: 102314

Parameter	Result mg/kg
Benzene	<0.010
cis-1,2-Dichloroethylene	<0.010
trans-1,2-Dichloroethylene	<0.010
Ethylbenzene	<0.010

Parameter	Result mg/kg
Tetrachloroethene	<0.010
Toluene	<0.010
Trichloroethylene	<0.010
Xylene, Total	<0.030

## BATTLE CRREK ANG VOA SOIL

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan

ANG- Battle Creek

Subm: November 2, 1994 sampling

Sample: 1B51517

Submittal Number 32565- 1

Date Sampled: 11/07/94 Time: 11:10

Date Received: 11/08/94 Time: 08:25

Analysis Date: 11/09/94

Lab Sample No: 102315

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

## BATTLE CREEK ANG VOA'S

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: BCER4

Submittal Number 32565- 1  
Date Sampled: 11/07/94 Time: 16:00  
Date Received: 11/08/94 Time: 08:25  
Analysis Date: 11/08/94  
Lab Sample No: 102316

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	<1.0	Tetrachloroethene	<1.0
cis-1,2-Dichloroethylene	<1.0	Toluene	1.5
trans-1,2-Dichloroethene	<1.0	Trichloroethylene	<1.0
Ethylbenzene	<1.0	Xylene, Total	<3.0



## BATTLE CRREK ANG VOA SOIL

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1B61012

Submittal Number 32565- 1  
Date Sampled: 11/08/94 Time: 09:00  
Date Received: 11/08/94 Time: 13:30  
Analysis Date: 11/09/94  
Lab Sample No: 102376

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

## BATTLE CRREK ANG VOA SOIL

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1B171012

Submittal Number 32565- 1  
Date Sampled: 11/08/94 Time: 10:15  
Date Received: 11/08/94 Time: 13:30  
Analysis Date: 11/09/94  
Lab Sample No: 102377

Parameter	Result mg/kg
Benzene	<0.010
cis-1,2-Dichloroethylene	<0.010
trans-1,2-Dichloroethylene	<0.010
Ethylbenzene	<0.010

Parameter	Result mg/kg
Tetrachloroethene	<0.010
Toluene	<0.010
Trichloroethylene	<0.010
Xylene, Total	<0.030

BATTLE CRREK ANG VOA SOIL

**EARTH TECH - OAK RIDGE**

Proj: Field Analysis Michigan  
 ANG- Battle Creek  
 Subm: November 2, 1994 sampling  
 Sample: 1B141012

Submittal Number 32565- 1  
 Date Sampled: 11/08/94 Time: 08:45  
 Date Received: 11/08/94 Time: 13:30  
 Analysis Date: 11/09/94  
 Lab Sample No: 102378

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030



## BATTLE CRREK ANG VOA SOIL

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1B161012

Submittal Number 32565- 1  
Date Sampled: 11/08/94 Time: 09:45  
Date Received: 11/08/94 Time: 13:30  
Analysis Date: 11/09/94  
Lab Sample No: 102379

## Parameter

Result  
mg/kg

## Parameter

Result  
mg/kg

Benzene <0.010  
cis-1,2-Dichloroethylene <0.010  
trans-1,2-Dichloroethene <0.010  
Ethylbenzene <0.010

Tetrachloroethene <0.010  
Toluene <0.010  
Trichloroethylene <0.010  
Xylene, Total <0.030

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## BATTLE CRREK ANG VOA SOIL

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1B151012

Submittal Number 32565- 1  
Date Sampled: 11/08/94 Time: 09:30  
Date Received: 11/08/94 Time: 13:30  
Analysis Date: 11/09/94  
Lab Sample No: 102380

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

## BATTLE CRREK ANG VOA SOIL

## EARTH TECH - OAK RIDGE

Proj: Field Analysis Michigan  
ANG- Battle Creek  
Subm: November 2, 1994 sampling  
Sample: 1B131012

Submittal Number 32565- 1  
Date Sampled: 11/08/94 Time: 08:15  
Date Received: 11/08/94 Time: 13:30  
Analysis Date: 11/09/94  
Lab Sample No: 102381

Parameter	Result mg/kg
Benzene	<0.010
cis-1,2-Dichloroethylene	<0.010
trans-1,2-Dichloroethene	<0.010
Ethylbenzene	<0.010

Parameter	Result mg/kg
Tetrachloroethene	<0.010
Toluene	<0.010
Trichloroethylene	<0.010
Xylene, Total	<0.030

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## MOBILE LABORATORY DATA

Client: Michigan Air National Guard

Location: Battle Creek, MI

Project Number: 94890107

Sample ID	Compound	Result	Units ug/l or mg/kg*	Matrix	Date Sampled	Time Sampled
BC1CONA	Total PAH	0.37	mg/kg	Soil	11/6/94	17:00
BC1CONB	Total PAH	110	mg/kg	Soil	11/6/94	17:10
1B10507	Total PAH	<0.20	mg/kg	Soil	11/6/94	13:20
1B11012	Total PAH	0.23	mg/kg	Soil	11/6/94	13:50
1B11517	Total PAH	0.29	mg/kg	Soil	11/6/94	14:10
1B12022	Total PAH	0.44	mg/kg	Soil	11/6/94	14:38
1B12527	Total PAH	<0.20	mg/kg	Soil	11/6/94	14:55
1B12527D	Total PAH	0.20	mg/kg	Soil	11/6/94	14:55
1B20507	Total PAH	0.56	mg/kg	Soil	11/6/94	11:30
1B21012	Total PAH	0.24	mg/kg	Soil	11/6/94	11:40
1B21517	Total PAH	5.0	mg/kg	Soil	11/6/94	11:50
1B22022	Total PAH	>5.0	mg/kg	Soil	11/6/94	12:00
1B40507	Total PAH	0.21**	mg/kg	Soil	11/6/94	15:35
1B41012	Total PAH	<0.20	mg/kg	Soil	11/6/94	15:45

\*Soils analyzed on a wet weight basis. \*\*reanalysis did not confirm.

## MOBILE LABORATORY DATA

Client: Michigan Air National Guard

Location: Battle Creek, MI

Project Number: 94890107

Sample ID	Compound	Result	Units ug/l or mg/kg*	Matrix	Date Sampled	Time Sampled
1B41012D	Total PAH	0.40***	mg/kg	Soil	11/6/94	15:45
1B41517	Total PAH	0.41	mg/kg	Soil	11/6/94	16:10
1B82022	Total PAH	0.27	mg/kg	Soil	11/7/94	16:10
1B52527	Total PAH	>5.0	mg/kg	Soil	11/7/94	12:10
1B121517	Total PAH	<0.20	mg/kg	Soil	11/7/94	14:30
1B122022	Total PAH	<0.20	mg/kg	Soil	11/7/94	14:45
1B52022	Total PAH	<0.20	mg/kg	Soil	11/7/94	11:40
1B30001	Total PAH	3.7	mg/kg	Soil	11/7/94	10:35
1B51517	Total PAH	<0.20	mg/kg	Soil	11/7/94	11:10
1B80507	Total PAH	<0.20	mg/kg	Soil	11/7/94	15:15
1B10001	Total PAH	2.0	mg/kg	Soil	11/7/94	9:30
1B120507	Total PAH	<0.20	mg/kg	Soil	11/7/94	13:35
1B50507	Total PAH	0.25**	mg/kg	Soil	11/7/94	10:15
1B20001	Total PAH	>5.0	mg/kg	Soil	11/7/94	9:00

\*Soils analyzed on a wet weight basis. \*\*reanalysis did not confirm. \*\*\*confirmed by reanalysis.



## MOBILE LABORATORY DATA

Client: Michigan Air National Guard

Location: Battle Creek, MI

Project Number: 94890107

Sample ID	Compound	Result	Units ug/l or mg/kg*	Matrix	Date Sampled	Time Sampled
1B52527D	Total PAH	>5.0	mg/kg	Soil	11/7/94	12:10
1B51012	Total PAH	0.52	mg/kg	Soil	11/7/94	10:50
1B61012	Total PAH	<0.20	mg/kg	Soil	11/8/94	9:00
1B131012	Total PAH	<0.20	mg/kg	Soil	11/8/94	8:15
1B151012	Total PAH	<0.20	mg/kg	Soil	11/8/94	9:30
1B141012	Total PAH	<0.20	mg/kg	Soil	11/8/94	8:45
1B171012	Total PAH	<0.20	mg/kg	Soil	11/8/94	10:15
1B161012	Total PAH	0.30	mg/kg	Soil	11/8/94	9:45
1B161012 Lab Dup	Total PAH	0.30	mg/kg	Soil	11/8/94	9:45
1B81012	Total PAH	<0.20	mg/kg	Soil	11/7/94	15:35
1B90001	Total PAH	1.2	mg/kg	Soil	11/9/94	15:20
1B110001	Total PAH	0.87	mg/kg	Soil	11/10/94	10:30
1SS04	Total PAH	3.4	mg/kg	Soil	11/10/94	11:59
1SS03	Total PAH	>5.0	mg/kg	Soil	11/10/94	12:08

\*Soils analyzed on a wet weight basis.

## MOBILE LABORATORY DATA

Client: Michigan Air National Guard

Location: Battle Creek, MI

Project Number: 94890107

Sample ID	Compound	Result	Units ug/l or mg/kg*	Matrix	Date Sampled	Time Sampled
1SS02	Total PAH	>5.0	mg/kg	Soil	11/10/94	11:55
1SS01	Total PAH	>5.0	mg/kg	Soil	11/10/94	11:50
1B71012	Total PAH	0.42	mg/kg	Soil	11/9/94	11:45
1B70001	Total PAH	>5.0	mg/kg	Soil	11/9/94	14:55
1B71517	Total PAH	0.26	mg/kg	Soil	11/9/94	11:50
1B90507	Total PAH	<0.20	mg/kg	Soil	11/9/94	16:30
1B91012	Total PAH	1.1	mg/kg	Soil	11/9/94	16:45
1B110507	Total PAH	<0.20	mg/kg	Soil	11/9/94	14:40
1B120001	Total PAH	2.9	mg/kg	Soil	11/9/94	14:25
1B91517	Total PAH	<0.20	mg/kg	Soil	11/9/94	17:30
1B120001 Lab Dup	Total PAH	2.9	mg/kg	Soil	11/9/94	14:25
1B111517	Total PAH	<0.20	mg/kg	Soil	11/9/94	15:10
1B92022	Total PAH	0.21	mg/kg	Soil	11/9/94	17:20
1B111012	Total PAH	0.24	mg/kg	Soil	11/9/94	14:55
1B111923	Total PAH	<0.20	mg/kg	Soil	11/9/94	15:40

\*Soils analyzed on a wet weight basis.

Smith-J/MANG

## MOBILE LABORATORY DATA

Client: Michigan Air National Guard

Location: Battle Creek, MI

Project Number: 94890107

Sample ID	Compound	Result	Units ug/l or mg/kg*	Matrix	Date Sampled	Time Sampled
1B111923 D	Total PAH	<0.20	mg/kg	Soil	11/9/94	15:40
1B190001	Total PAH	0.79	mg/kg	Soil	11/10/94	10:50
1B31012	Total PAH	<0.20	mg/kg	Soil	11/8/94	16:50
1B32022	Total PAH	230	mg/kg	Soil	11/8/94	17:15
1B30507D	Total PAH	<0.20	mg/kg	Soil	11/8/94	16:30
1B30507	Total PAH	<0.20	mg/kg	Soil	11/8/94	16:30
1B31517	Total PAH	2.2	mg/kg	Soil	11/8/94	17:05
1B40001	Total PAH	>5.0	mg/kg	Soil	11/9/94	9:00
1B191517	Total PAH	<0.20	mg/kg	Soil	11/9/94	10:30
1B192022	Total PAH	<0.20	mg/kg	Soil	11/9/94	10:55
1B70507	Total PAH	<0.20	mg/kg	Soil	11/9/94	11:30
1B180507	Total PAH	<0.20	mg/kg	Soil	11/9/94	8:20
1B50001	Total PAH	4.9	mg/kg	Soil	11/9/94	9:35
1B191012	Total PAH	<0.20	mg/kg	Soil	11/9/94	10:15
1B181012	Total PAH	<0.20	mg/kg	Soil	11/9/94	8:35

\*Soils analyzed on a wet weight basis.

## MOBILE LABORATORY DATA

**Client: Michigan Air National Guard**

**Location: Battle Creek, MI**

**Project Number: 94890107**

[illegible]

**\*Soils analyzed on a wet weight basis.**

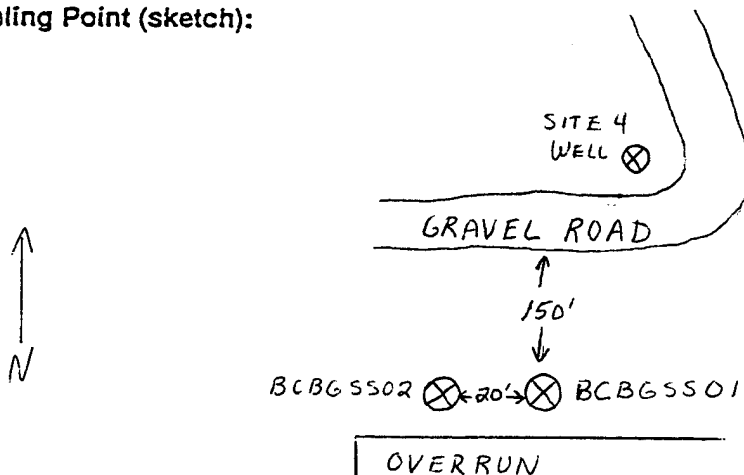
## **APPENDIX C: SOIL SAMPLING FORMS**

# Soil/Sediment Sampling Record

Project Name 110<sup>th</sup> FL MIANG RI Project Number 948901  
 Location BATTLE CREEK, MICHIGAN Sample Number BCBG5501  
 Recorded By J. BRIEGEL Duplicate Number \_\_\_\_\_  
 Date 12-17-94 Checked By JSB  
 Site BACKGROUND Date 6/3/95

Sampling Equipment HAND AUGER  
 Sample Type Soil Sediment Rock  
 Sample Type Description  
 USCS Soil Type SC  
 Color BROWN/ORANGE BROWN  
 Odor NONE  
 Depth 0-1'  
 Number of Samples 1  
 Comments \_\_\_\_\_

## Sampling Point (sketch):



## Decontamination

Equipment: ☒ Hand auger  
 Type AMS  
☒ Trowel  
☐ Other \_\_\_\_\_

Decontamination Fluids: \_\_\_\_\_  
☐ Steam/Hot Water ☒ Methanol  
☒ Detergent/water ☐ Hexane  
☐ Potable Water ☐ HNO<sub>3</sub> ; dilution  
☒ Deionized Water ☐ Other \_\_\_\_\_

# Soil/Sediment Sampling Record

Project Name <u>110<sup>th</sup> FG, MIANG RI</u>	Project Number <u>948901</u>
Location <u>BATTLE CREEK, MICHIGAN</u>	Sample Number <u>BCBG5502</u>
Recorded By <u>J. BRIEGEL</u>	Duplicate Number _____
Date <u>12-17-94</u>	Checked By <u>JSB</u>
Site <u>BACKGROUND</u>	Date <u>6/3/95</u>

Sampling Equipment HAND AUGER

Sample Type Soil      Sediment      Rock

Sample Type Description

USCS Soil Type SC

Color BROWN/ORANGE BROWN

Odor NONE

Depth 0-1'

Number of Samples 1

Comments \_\_\_\_\_

Sampling Point (sketch):

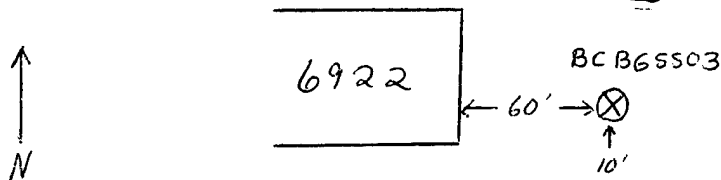
Decontamination		Decontamination Fluids: _____	
Equipment: <input checked="" type="checkbox"/> Hand auger	Type <u>AMS</u>	<input type="checkbox"/> Steam/Hot Water	<input checked="" type="checkbox"/> Methanol
<input checked="" type="checkbox"/> Trowel		<input checked="" type="checkbox"/> Detergent/water	<input type="checkbox"/> Hexane
<input type="checkbox"/> Other _____		<input type="checkbox"/> Potable Water	<input type="checkbox"/> HNO <sub>3</sub> ; dilution
		<input checked="" type="checkbox"/> Deionized Water	<input type="checkbox"/> Other _____

# Soil/Sediment Sampling Record

Project Name 110<sup>th</sup> FG, MIANG RI Project Number 948901  
 Location BATTLE CREEK, MICHIGAN Sample Number BCBGSS03  
 Recorded By J. BRIEGEL Duplicate Number BCBGSS03D  
 Date 12-17-94 Checked By JJB  
 Site BACKGROUND Date 6/3/95

Sampling Equipment HAND AUGER  
 Sample Type Soil Sediment Rock  
 Sample Type Description  
 USCS Soil Type SC  
 Color BROWN  
 Odor NONE  
 Depth 0-1'  
 Number of Samples 2  
 Comments \_\_\_\_\_

## Sampling Point (sketch):



## Decontamination

Equipment: ☒ Hand auger  
 Type AMS  
☒ Trowel  
☐ Other \_\_\_\_\_

Decontamination Fluids: \_\_\_\_\_  
☐ Steam/Hot Water ☒ Methanol  
☒ Detergent/water ☐ Hexane  
☐ Potable Water ☐ HNO<sub>3</sub> ; dilution  
☒ Deionized Water ☐ Other \_\_\_\_\_




## Soil/Sediment Sampling Record

Project Name <u>110<sup>th</sup> FG, MIANG RI</u>	Project Number <u>948901</u>
Location <u>BATTLE CREEK, MICHIGAN</u>	Sample Number <u>BCB65504</u>
Recorded By <u>J. BRIEGEL</u>	Duplicate Number _____
Date <u>12-17-94</u>	Checked By <u>JSB</u>
Site <u>BACKGROUND</u>	Date <u>6/3/95</u>


Sampling Equipment <u>HAND AUGER</u>			
Sample Type	<u>(Soil)</u>	Sediment	Rock
Sample Type Description			
USCS Soil Type <u>SC</u>			
Color <u>DARK BROWN</u>			
Odor <u>NONE</u>			
Depth <u>0-1'</u>			
Number of Samples <u>1</u>			
Comments _____			

**Sampling Point (sketch):**

  
N

6922

←
80'
→

  
BCB65504

<b>Decontamination</b>	
Equipment: <input checked="" type="checkbox"/> Hand auger Type <u>AMS</u> <input checked="" type="checkbox"/> Trowel <input type="checkbox"/> Other _____	Decontamination Fluids: _____ <input type="checkbox"/> Steam/Hot Water <input checked="" type="checkbox"/> Methanol <input checked="" type="checkbox"/> Detergent/water <input type="checkbox"/> Hexane <input type="checkbox"/> Potable Water <input type="checkbox"/> HNO <sub>3</sub> ; dilution <input checked="" type="checkbox"/> Deionized Water <input type="checkbox"/> Other _____

# Soil/Sediment Sampling Record

Project Name <u>110<sup>th</sup> FG, MIANG RI</u>	Project Number <u>948901</u>
Location <u>BATTLE CREEK, MICHIGAN</u>	Sample Number <u>BCBGSS05</u>
Recorded By <u>J. BRIEGEL</u>	Duplicate Number <u>1</u>
Date <u>12-18-94</u>	Checked By <u>JSB</u>
Site <u>BACKGROUND</u>	Date <u>6/3/95</u>

Sampling Equipment HAND AUGER

Sample Type Soil      Sediment      Rock

Sample Type Description

USCS Soil Type SC

Color DARK BROWN

Odor NONE

Depth 0-1'

Number of Samples 1

Comments \_\_\_\_\_

Sampling Point (sketch): GRAVEL OVERRUN

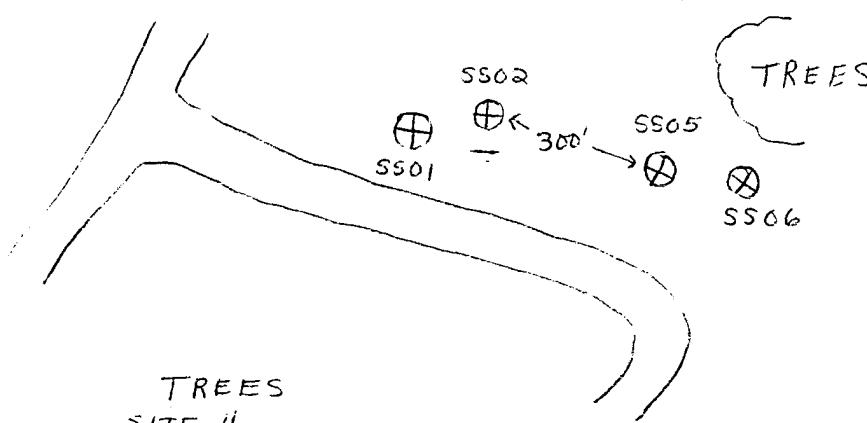
Decontamination		Decontamination Fluids: _____	
Equipment: <input checked="" type="checkbox"/> Hand auger	<input type="checkbox"/> Steam/Hot Water	<input checked="" type="checkbox"/> Methanol	
Type <u>AMS</u>	<input checked="" type="checkbox"/> Detergent/water	<input type="checkbox"/> Hexane	
<input checked="" type="checkbox"/> Trowel	<input type="checkbox"/> Potable Water	<input type="checkbox"/> HNO <sub>3</sub> ; dilution	
<input type="checkbox"/> Other _____	<input checked="" type="checkbox"/> Deionized Water	<input type="checkbox"/> Other _____	

## Soil/Sediment Sampling Record

Project Name <u>110<sup>th</sup> FG, MIANG RI</u>	Project Number <u>948901</u>
Location <u>BATTLE CREEK, MICHIGAN</u>	Sample Number <u>BCBGSS06</u>
Recorded By <u>J. BRIEGEL</u>	Duplicate Number <u>BCBGSS06D</u>
Date <u>12-18-94</u>	Checked By <u>JSB</u>
Site <u>BACKGROUND</u>	Date <u>6/3/95</u>

Sampling Equipment <u>HAND AUGER</u>			
Sample Type	<u>Soil</u>	Sediment	Rock
Sample Type Description			
USCS Soil Type <u>SC</u>			
Color <u>DARK BROWN</u>			
Odor <u>NONE</u>			
Depth <u>0-1'</u>			
Number of Samples <u>2</u>			
Comments _____			

Sampling Point (sketch):



Decontamination		Decontamination Fluids: _____	
Equipment: <input checked="" type="checkbox"/> Hand auger	<input type="checkbox"/> Steam/Hot Water	<input checked="" type="checkbox"/> Methanol	
Type <u>AMS</u>	<input checked="" type="checkbox"/> Detergent/water	<input type="checkbox"/> Hexane	
<input checked="" type="checkbox"/> Trowel	<input type="checkbox"/> Potable Water	<input type="checkbox"/> HNO <sub>3</sub> ; dilution	
<input type="checkbox"/> Other _____	<input checked="" type="checkbox"/> Deionized Water	<input type="checkbox"/> Other _____	

## Soil/Sediment Sampling Record

Project Name 110<sup>th</sup> FG, MIANG RI

Project Number 948901

Location BATTLE CREEK, MICHIGAN

Sample Number BC BGSSD7

Recorded By J. BRIEGEL

Duplicate Number \_\_\_\_\_

Date 12-18-94

Checked By JJB

Site BACKGROUND

Date 6/3/95

Sampling Equipment HAND AUGER

Sample Type

Soil

Sediment

Rock

Sample Type Description

USCS Soil Type SC

Color DARK BROWN

Odor NONE

Depth 0-1'

Number of Samples 1

Comments \_\_\_\_\_

Sampling Point (sketch):

### Decontamination

Equipment: ☒ Hand auger

Type AMS

☒ Trowel

☐ Other \_\_\_\_\_

Decontamination Fluids: \_\_\_\_\_

☐ Steam/Hot Water

☒ Detergent/water

☐ Potable Water

☒ Deionized Water

☒ Methanol

☐ Hexane

☐ HNO<sub>3</sub> ; dilution

☐ Other \_\_\_\_\_

## Soil/Sediment Sampling Record

Project Name <u>110<sup>th</sup> F6, MIAMG RI</u>	Project Number <u>948901</u>
Location <u>BATTLE CREEK MICHIGAN</u>	Sample Number <u>BCBG5508</u>
Recorded By <u>J. BRIEGEL</u>	Duplicate Number _____
Date <u>12-18-94</u>	Checked By <u>JJB</u>
Site <u>BACKGROUND</u>	Date <u>6/7/95</u>

Sampling Equipment <u>HAND AUGER</u>
Sample Type <u>Soil</u> Sediment      Rock
Sample Type Description
USCS Soil Type <u>SC</u>
Color <u>DARK BROWN</u>
Odor <u>NONE</u>
Depth <u>0 - 1'</u>
Number of Samples <u>1</u>
Comments _____

Sampling Point (sketch):

Decontamination	Decontamination Fluids: _____
Equipment: <input checked="" type="checkbox"/> Hand auger	<input type="checkbox"/> Steam/Hot Water <input checked="" type="checkbox"/> Methanol
Type <u>AMS</u>	<input checked="" type="checkbox"/> Detergent/water <input type="checkbox"/> Hexane
<input checked="" type="checkbox"/> Trowel	<input type="checkbox"/> Potable Water <input type="checkbox"/> HNO <sub>3</sub> ; dilution
<input type="checkbox"/> Other _____	<input checked="" type="checkbox"/> Deionized Water <input type="checkbox"/> Other _____

# Soil/Sediment Sampling Record

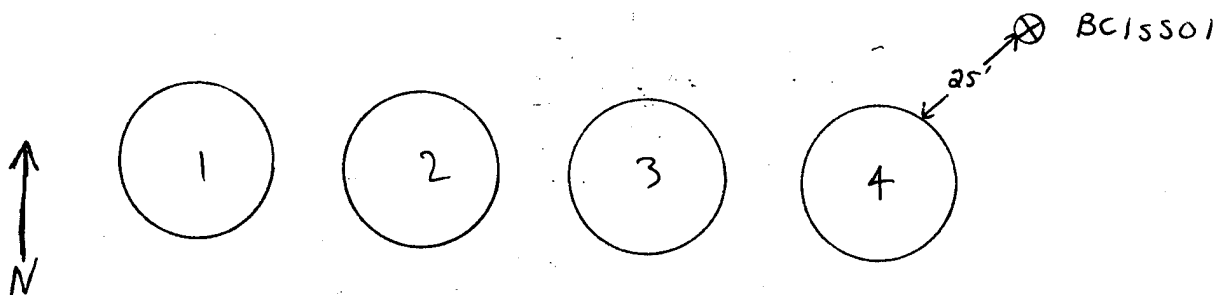
Project Name 110<sup>th</sup> FL MIANG RI Project Number 948901  
 Location BATTLE CREEK, MICHIGAN Sample Number BC15501  
 Recorded By J. BRIEGEL Duplicate Number \_\_\_\_\_  
 Date 11/10/94 Checked By JBB  
 Site Site 1 Date 6/5/95

Sampling Equipment HAND AUGER  
 Sample Type Soil Sediment Rock

## Sample Type Description

USCS Soil Type SC  
 Color DK BROWN  
 Odor NONE  
 Depth 0-1'  
 Number of Samples 1  
 Comments \_\_\_\_\_

## Sampling Point (sketch):



## Decontamination

Equipment: ☒ Hand auger  
 Type AMS  
☒ Trowel  
☐ Other \_\_\_\_\_

Decontamination Fluids: \_\_\_\_\_  
☐ Steam/Hot Water ☒ Methanol  
☒ Detergent/water ☐ Hexane  
☐ Potable Water ☐ HNO<sub>3</sub> ; dilution  
☒ Deionized Water ☐ Other \_\_\_\_\_

# Soil/Sediment Sampling Record

Project Name <u>110<sup>th</sup> FL MIANG RI</u>	Project Number <u>948901</u>
Location <u>BATTLE CREEK, MICHIGAN</u>	Sample Number <u>BC15502</u>
Recorded By <u>J. BRIEGEL</u>	Duplicate Number _____
Date <u>11-10-94</u>	Checked By <u>JBB</u>
Site <u>1</u>	Date <u>6/5/95</u>

Sampling Equipment HAND AUGER

Sample Type Soil      Sediment      Rock

Sample Type Description

USCS Soil Type SC

Color BROWN

Odor NONE

Depth 0-1'

Number of Samples 1

Comments \_\_\_\_\_

Sampling Point (sketch):

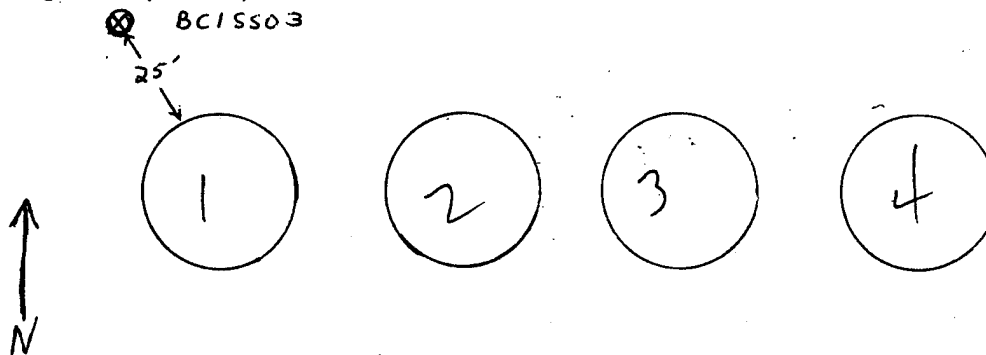
Decontamination		Decontamination Fluids: _____	
Equipment: <input checked="" type="checkbox"/> Hand auger	<input type="checkbox"/> Steam/Hot Water	<input checked="" type="checkbox"/> Methanol	
Type <u>AMS</u>	<input checked="" type="checkbox"/> Detergent/water	<input type="checkbox"/> Hexane	
<input checked="" type="checkbox"/> Trowel	<input type="checkbox"/> Potable Water	<input type="checkbox"/> HNO <sub>3</sub> ; dilution	
<input type="checkbox"/> Other _____	<input checked="" type="checkbox"/> Deionized Water	<input type="checkbox"/> Other _____	

# Soil/Sediment Sampling Record

Project Name 110<sup>th</sup> FL MIANG RI Project Number 948901  
 Location BATTLE CREEK, MICHIGAN Sample Number BC1SS03  
 Recorded By J. BRIEGEL Duplicate Number \_\_\_\_\_  
 Date 11-10-94 Checked By JRB  
 Site 1 Date 6/5/95

Sampling Equipment HAND AUGER  
 Sample Type Soil Sediment Rock  
 Sample Type Description  
 USCS Soil Type SC  
 Color BROWN ORANGE BROWN  
 Odor NONE  
 Depth 0-1'  
 Number of Samples 1  
 Comments \_\_\_\_\_

## Sampling Point (sketch):



## Decontamination

Equipment: ☒ Hand auger  
 Type AMS  
☒ Trowel  
☐ Other \_\_\_\_\_

Decontamination Fluids: \_\_\_\_\_  
☐ Steam/Hot Water ☒ Methanol  
☒ Detergent/water ☐ Hexane  
☐ Potable Water ☐ HNO<sub>3</sub> ; dilution  
☒ Deionized Water ☐ Other \_\_\_\_\_



# Soil/Sediment Sampling Record

Project Name <u>110<sup>th</sup> FL MIANG RI</u>	Project Number <u>948901</u>
Location <u>BATTLE CREEK, MICHIGAN</u>	Sample Number <u>BC15504</u>
Recorded By <u>J. BRIEGEL</u>	Duplicate Number _____
Date <u>11/10/94</u>	Checked By <u>JSB</u>
Site <u>1</u>	Date <u>6/5/95</u>

Sampling Equipment HAND AUGER

Sample Type Soil      Sediment      Rock

Sample Type Description

USCS Soil Type SC

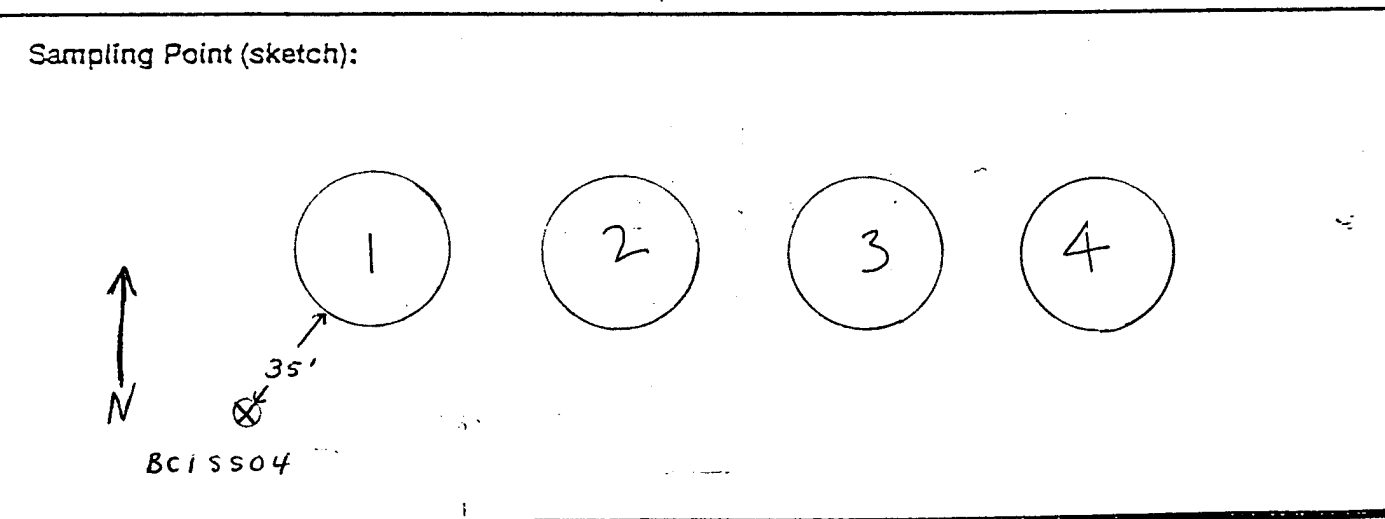
Color DK BROWN

Odor NONE

Depth 0-1'

Number of Samples 1

Comments \_\_\_\_\_



Decontamination

Equipment: ☒ Hand auger  
                   Type AMS

☒ Trowel  
☐ Other \_\_\_\_\_

Decontamination Fluids: \_\_\_\_\_

<input type="checkbox"/> Steam/Hot Water	<input checked="" type="checkbox"/> Methanol
<input checked="" type="checkbox"/> Detergent/water	<input type="checkbox"/> Hexane
<input type="checkbox"/> Potable Water	<input type="checkbox"/> HNO <sub>3</sub> ; dilution
<input checked="" type="checkbox"/> Deionized Water	<input type="checkbox"/> Other _____

# Soil/Sediment Sampling Record

Project Name <u>110<sup>th</sup> FG, MIANG RI</u>	Project Number <u>948901</u>
Location <u>BATTLE CREEK, MICHIGAN</u>	Sample Number <u>BCISS05</u>
Recorded By <u>J. BRIEGEL</u>	Duplicate Number _____
Date <u>12-17-94</u>	Checked By <u>JJB</u>
Site <u>1</u>	Date <u>6/3/95</u>

Sampling Equipment <u>HAND AUGER</u>		
Sample Type	<u>Soil</u>	Sediment      Rock
Sample Type Description		
USCS Soil Type <u>SM</u>		
Color <u>BROWN</u>		
Odor <u>NONE</u>		
Depth <u>0-1'</u>		
Number of Samples <u>1</u>		
Comments _____		

Sampling Point (sketch):

Decontamination	
Equipment: <input checked="" type="checkbox"/> Hand auger	Decontamination Fluids: _____
Type <u>AMS</u>	<input type="checkbox"/> Steam/Hot Water
<input checked="" type="checkbox"/> Trowel	<input checked="" type="checkbox"/> Methanol
<input type="checkbox"/> Other _____	<input type="checkbox"/> Hexane
	<input type="checkbox"/> Potable Water
	<input type="checkbox"/> HNO <sub>3</sub> ; dilution
	<input checked="" type="checkbox"/> Deionized Water
	<input type="checkbox"/> Other _____



# Soil/Sediment Sampling Record

Project Name 110<sup>th</sup> FG, MIANG RI  
 Location BATTLE CREEK, MICHIGAN  
 Recorded By J. BRIEGEL  
 Date 12-17-94  
 Site 1

Project Number 948901  
 Sample Number BCISS07  
 Duplicate Number \_\_\_\_\_  
 Checked By JGB  
 Date 6/2/95

Sampling Equipment HAND AUGER

Sample Type

Soil

Sediment

Rock

Sample Type Description

USCS Soil Type SC

Color BROWN

Odor NONE

Depth 0-1'

Number of Samples 1

Comments \_\_\_\_\_

Sampling Point (sketch):

## Decontamination

Equipment: ☒ Hand auger  
 Type AMS  
☒ Trowel  
☐ Other \_\_\_\_\_

Decontamination Fluids: \_\_\_\_\_

☐ Steam/Hot Water ☒ Methanol  
☒ Detergent/water ☐ Hexane  
☐ Potable Water ☐ HNO<sub>3</sub> ; dilution  
☒ Deionized Water ☐ Other \_\_\_\_\_

## Soil/Sediment Sampling Record

Project Name <u>110<sup>th</sup> FG, MIANG RI</u>	Project Number <u>948901</u>
Location <u>BATTLE CREEK, MICHIGAN</u>	Sample Number <u>BC15508</u>
Recorded By <u>J. BRIEGEL</u>	Duplicate Number _____
Date <u>12-17-94</u>	Checked By <u>JSB</u>
Site <u>1</u>	Date <u>6/3/95</u>

Sampling Equipment HAND AUGER

Sample Type      Soil      Sediment      Rock

Sample Type Description

USCS Soil Type GW

Color \_\_\_\_\_

Odor NONE

Depth 0-1'

Number of Samples 1

Comments \_\_\_\_\_

Sampling Point (sketch):

Decontamination	
Equipment: <input checked="" type="checkbox"/> Hand auger Type <u>AMS</u> <input checked="" type="checkbox"/> Trowel <input type="checkbox"/> Other _____	Decontamination Fluids: _____ <input type="checkbox"/> Steam/Hot Water <input checked="" type="checkbox"/> Methanol <input checked="" type="checkbox"/> Detergent/water <input type="checkbox"/> Hexane <input type="checkbox"/> Potable Water <input type="checkbox"/> HNO <sub>3</sub> ; dilution <input checked="" type="checkbox"/> Deionized Water <input type="checkbox"/> Other _____

# Soil/Sediment Sampling Record

Project Name <u>110<sup>th</sup> FG, MIANG RI</u>	Project Number <u>948901</u>
Location <u>BATTLE CREEK, MICHIGAN</u>	Sample Number <u>BC15509</u>
Recorded By <u>J. BRIEGEL</u>	Duplicate Number <u>BC15509D</u>
Date <u>12-17-94</u>	Checked By <u>JTB</u>
Site <u>1</u>	Date <u>6/3/95</u>

Sampling Equipment HAND AUGER

Sample Type Soil      Sediment      Rock

## Sample Type Description

USCS Soil Type SP

Color BROWN

Odor NONE

Depth 0-1'

Number of Samples 2

Comments \_\_\_\_\_

## Sampling Point (sketch):

## Decontamination

Equipment: ☒ Hand auger  
                   Type AMS  
☒ Trowel  
☐ Other \_\_\_\_\_

## Decontamination Fluids: \_\_\_\_\_

<input type="checkbox"/> Steam/Hot Water	<input checked="" type="checkbox"/> Methanol
<input checked="" type="checkbox"/> Detergent/water	<input type="checkbox"/> Hexane
<input type="checkbox"/> Potable Water	<input type="checkbox"/> HNO <sub>3</sub> ; dilution
<input checked="" type="checkbox"/> Deionized Water	<input type="checkbox"/> Other _____

## Soil/Sediment Sampling Record

Project Name	<u>110<sup>th</sup> EG, MIANG RI</u>	Project Number	<u>948901</u>
Location	<u>BATTLE CREEK, MICHIGAN</u>	Sample Number	<u>BCISS10</u>
Recorded By	<u>J BRIEDEL</u>	Duplicate Number	_____
Date	<u>12-17-94</u>	Checked By	<u>JB</u>
Site	<u>1</u>	Date	<u>6/3/95</u>

Sampling Equipment	<u>HAND AUGER</u>		
Sample Type	<input checked="" type="radio"/> Soil	<input type="radio"/> Sediment	<input type="radio"/> Rock
Sample Type Description			
USCS Soil Type <u>SW</u>			
Color <u>BROWN</u>			
Odor <u>NONE</u>			
Depth <u>0-1'</u>			
Number of Samples <u>1</u>			
Comments _____			

Sampling Point (sketch):

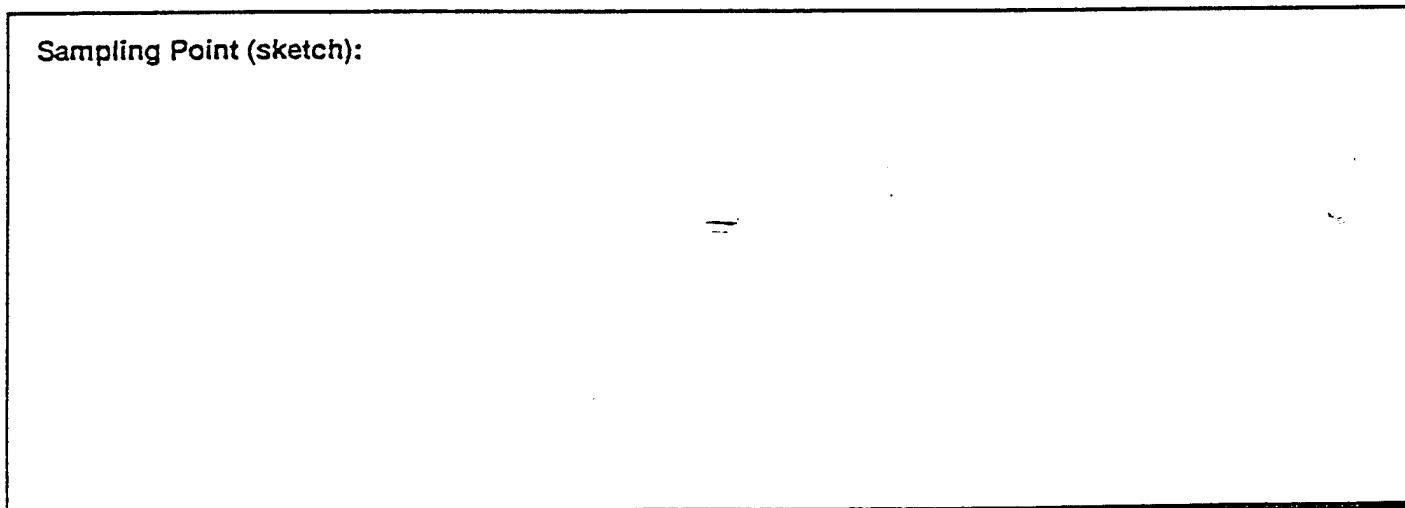
Decontamination		Decontamination Fluids: _____	
Equipment:	<input checked="" type="checkbox"/> Hand auger	<input type="checkbox"/> Steam/Hot Water	<input checked="" type="checkbox"/> Methanol
	Type <u>AMS</u>	<input checked="" type="checkbox"/> Detergent/water	<input type="checkbox"/> Hexane
	<input checked="" type="checkbox"/> Trowel	<input type="checkbox"/> Potable Water	<input type="checkbox"/> HNO <sub>3</sub> ; dilution
	<input type="checkbox"/> Other _____	<input checked="" type="checkbox"/> Deionized Water	<input type="checkbox"/> Other _____

## Soil/Sediment Sampling Record

Project Name <u>110<sup>th</sup> FG, MIANG RI</u>	Project Number <u>948901</u>
Location <u>BATTLE CREEK, MICHIGAN</u>	Sample Number <u>BC15511</u>
Recorded By <u>J. BRIEGEL</u>	Duplicate Number _____
Date <u>12-17-94</u>	Checked By <u>JSB</u>
Site <u>1</u>	Date <u>6/3/95</u>

Sampling Equipment <u>HAND AUGER</u>		
Sample Type	<u>Soil</u>	Sediment      Rock
Sample Type Description		
USCS Soil Type <u>SP</u>		
Color <u>ORANGE - BROWN</u>		
Odor <u>NONE</u>		
Depth <u>0 - 1'</u>		
Number of Samples <u>1</u>		
Comments _____		

**Sampling Point (sketch):**



Decontamination	
Equipment: <input checked="" type="checkbox"/> Hand auger Type <u>AMS</u> <input checked="" type="checkbox"/> Trowel <input type="checkbox"/> Other _____	Decontamination Fluids: _____ <input type="checkbox"/> Steam/Hot Water <input checked="" type="checkbox"/> Methanol <input checked="" type="checkbox"/> Detergent/water <input type="checkbox"/> Hexane <input type="checkbox"/> Potable Water <input type="checkbox"/> HNO <sub>3</sub> ; dilution <input checked="" type="checkbox"/> Deionized Water <input type="checkbox"/> Other _____



## Soil/Sediment Sampling Record

Project Name	<u>110<sup>th</sup> FG, MIANG RI</u>	Project Number	<u>948901</u>
Location	<u>BATTLE CREEK, MICHIGAN</u>	Sample Number	<u>BC15512</u>
Recorded By	<u>J. BRIEGEL</u>	Duplicate Number	
Date	<u>12-17-94</u>	Checked By	<u>JSB</u>
Site	<u>1</u>	Date	<u>6/3/95</u>

Sampling Equipment	<u>HAND AUGER</u>		
Sample Type	<u>Soil</u>	Sediment	Rock
Sample Type Description			
USCS Soil Type <u>SC</u>			
Color <u>ORANGE-BROWN</u>			
Odor <u>NONE</u>			
Depth <u>0-1'</u>			
Number of Samples <u>1</u>			
Comments			

Sampling Point (sketch):

Decontamination		Decontamination Fluids:	
Equipment:	<input checked="" type="checkbox"/> Hand auger	<input type="checkbox"/> Steam/Hot Water	<input checked="" type="checkbox"/> Methanol
	Type <u>AMS</u>	<input checked="" type="checkbox"/> Detergent/water	<input type="checkbox"/> Hexane
	<input checked="" type="checkbox"/> Trowel	<input type="checkbox"/> Potable Water	<input type="checkbox"/> HNO <sub>3</sub> ; dilution
	<input type="checkbox"/> Other	<input checked="" type="checkbox"/> Deionized Water	<input type="checkbox"/> Other

## Soil/Sediment Sampling Record

Project Name <u>110<sup>th</sup> FG, MIANG RI</u>	Project Number <u>948901</u>
Location <u>BATTLE CREEK, MICHIGAN</u>	Sample Number <u>BCISS13</u>
Recorded By <u>J. BRIEGEL</u>	Duplicate Number _____
Date <u>12-18-94</u>	Checked By <u>JSB</u>
Site <u>1</u>	Date <u>6/3/95</u>

Sampling Equipment <u>HAND AUGER</u>
Sample Type <u>Soil</u> Sediment      Rock
Sample Type Description
USCS Soil Type <u>SC</u>
Color <u>ORANGE-BROWN</u>
Odor <u>NONE</u>
Depth <u>0-1'</u>
Number of Samples <u>1</u>
Comments _____

Sampling Point (sketch):

Decontamination	
Equipment: <input checked="" type="checkbox"/> Hand auger Type <u>AMS</u>	Decontamination Fluids: _____
<input checked="" type="checkbox"/> Trowel	<input type="checkbox"/> Steam/Hot Water <input checked="" type="checkbox"/> Methanol
<input type="checkbox"/> Other _____	<input checked="" type="checkbox"/> Detergent/water <input type="checkbox"/> Hexane
	<input type="checkbox"/> Potable Water <input type="checkbox"/> HNO <sub>3</sub> ; dilution
	<input checked="" type="checkbox"/> Deionized Water <input type="checkbox"/> Other _____

## Soil/Sediment Sampling Record

Project Name <u>110<sup>th</sup> FG, MIANG RI</u>	Project Number <u>948901</u>
Location <u>BATTLE CREEK, MICHIGAN</u>	Sample Number <u>BC15514</u>
Recorded By <u>J BRIEGEL</u>	Duplicate Number _____
Date <u>12-18-94</u>	Checked By <u>JAB</u>
Site <u>1</u>	Date <u>6/3/95</u>

Sampling Equipment <u>HAND AUGER</u>		
Sample Type	<u>(Soil)</u>	Sediment      Rock
Sample Type Description		
USCS Soil Type <u>SC</u>		
Color <u>ORANGE - BROWN / BROWN</u>		
Odor <u>NONE</u>		
Depth <u>0-1'</u>		
Number of Samples <u>1</u>		
Comments _____		

**Sampling Point (sketch):**

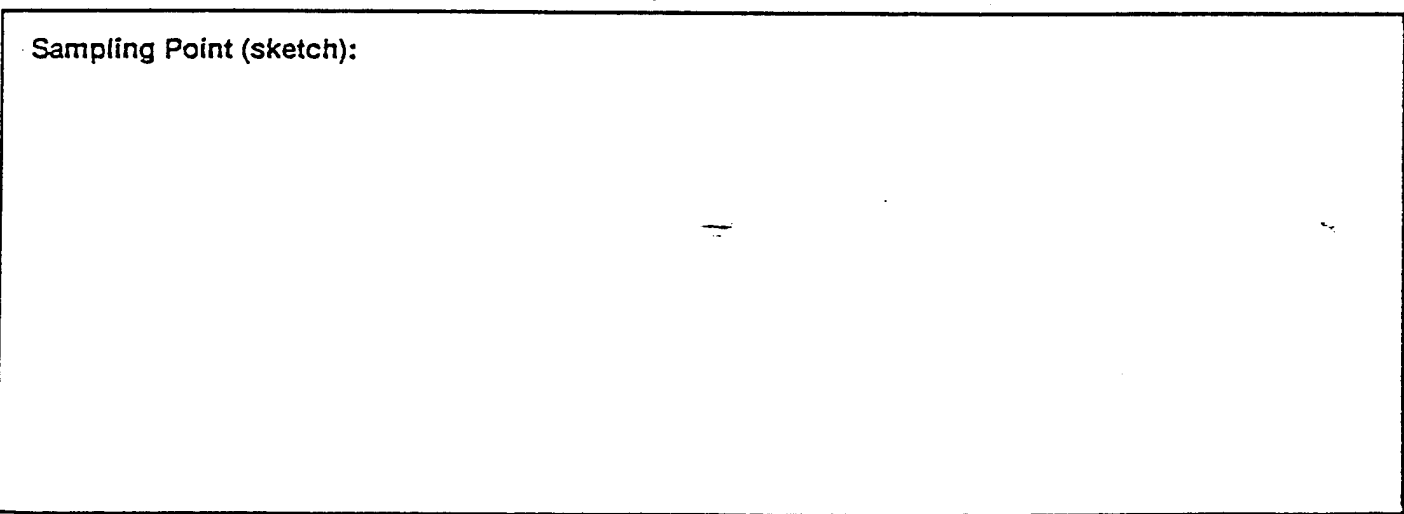
<b>Decontamination</b> Equipment: <input checked="" type="checkbox"/> Hand auger Type <u>AMS</u> <input checked="" type="checkbox"/> Trowel <input type="checkbox"/> Other _____		<b>Decontamination Fluids:</b> _____ <input type="checkbox"/> Steam/Hot Water <input checked="" type="checkbox"/> Methanol <input checked="" type="checkbox"/> Detergent/water <input type="checkbox"/> Hexane <input type="checkbox"/> Potable Water <input type="checkbox"/> HNO <sub>3</sub> ; dilution <input checked="" type="checkbox"/> Deionized Water <input type="checkbox"/> Other _____
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# Soil/Sediment Sampling Record

Project Name <u>110<sup>th</sup> FG, MIANG RI</u>	Project Number <u>948901</u>
Location <u>BATTLE CREEK, MICHIGAN</u>	Sample Number <u>BC15515</u>
Recorded By <u>J. BRIEGEL</u>	Duplicate Number _____
Date <u>12-18-94</u>	Checked By <u>JJB</u>
Site <u>1</u>	Date <u>6/3/95</u>

Sampling Equipment <u>HAND AUGER</u>			
Sample Type	<u>Soil</u>	Sediment	Rock
Sample Type Description			
USCS Soil Type <u>SW</u>			
Color <u>BROWN</u>			
Odor <u>NONE</u>			
Depth <u>0-1'</u>			
Number of Samples <u>1</u>			
Comments _____			

Sampling Point (sketch):



Decontamination		Decontamination Fluids: _____	
Equipment: <input checked="" type="checkbox"/> Hand auger	<input type="checkbox"/> Steam/Hot Water	<input checked="" type="checkbox"/> Methanol	
Type <u>AMS</u>	<input checked="" type="checkbox"/> Detergent/water	<input type="checkbox"/> Hexane	
<input checked="" type="checkbox"/> Trowel	<input type="checkbox"/> Potable Water	<input type="checkbox"/> HNO <sub>3</sub> ; dilution	
<input type="checkbox"/> Other _____	<input checked="" type="checkbox"/> Deionized Water	<input type="checkbox"/> Other _____	

**APPENDIX D: BOREHOLE LOGS**

## Borehole Log

Project Name: 110TH FG, MIANG						Project Number: 948901	
Borehole Location: SITE 1				Borehole No: BC1-MW1		Sheet 1 of 2	
Drilling Agency: STEARNS				Driller: MIKE HEFFERN			
Drilling Equipment: CME 550				Date Started: 13 DEC 94		Total Depth (feet): 32	
Drilling Method: HOLLOW STEM AUGER				Date Finished: 14 DEC 94		Depth To Bedrock (feet): NA	
Drilling Fluid: NA				Number of Samples: 11		Depth to Water (feet): ~27	
Completion Information: COMPLETED AS FLUSH MOUNT MONITORING WELL				Borehole Diameter (in): 7.25		Elevation and Datum:	
				Logged By: J. BRIEGEL / S. SMITH			
				Checked By: JSB		Date: 6/7/95	

Depth (feet)	Sample			Field Analysis		LOG		Lithologic Description	Remarks
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B		
1									
2									
3									
4									
5									
6									
7	1	0608	6/6/5	100%	1345	NA	0.0/0.1		
8									
9	2	0810	3/3/4/5	50%	1350	NA	0.0/0.0		
10									
11	3	1012	3/3/4/4	90%	1400	NA	0.0/0.0		
12									
13	4	1214	2/3/4/5	25%	1405	NA	0.0/0.0		
14									

Key

S/B = Sample reading / Background reading

NA = not analyzed

holelog1.dwg

## Borehole Log

Project Name: 110TH FG, MIANG										Project Number: 948901			
Borehole Location: SITE 1										Borehole No: BCI-MW1		Sheet 2 of 2	
Depth (feet)	Sample					Field Analysis		LOG		Checked By: JSG		Date: 6/3/5	
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B	Graphic	USCS or Rock Type	Lithologic Description		Remarks	
15	5	1416	2/4/16/9	50%	1410	NA	0.0/0.0			D.O. ABOVE 10YR5/8			
16										D.O. ABOVE, TRACE GRAVEL,			
17	6	1618	6/8/7/11	60%	1415	NA	0.0/0.0			MEDIUM DENSE			
18													
19	7	1820	9/11/11/14	60%	1420	NA	0.0/0.0			SAND, FINE TO V. COARSE GRAINED W/ GRAVEL, WELL SORTED, YELLOWISH BROWN (10YR5/8), MOIST, MEDIUM DENSE			
20													
21	8	2022	8/15/22/23	60%	1425	NA	0.0/0.0			SAND, MEDIUM TO COARSE GRAINED, YELLOWISH BROWN (10YR5/8) MOIST, DENSE			
22													
23	9	2224	8/12/14/14	60%	1432	NA	0.0/0.0			SAND, FINE TO MEDIUM GRAINED, TRACE GRAVEL, YELLOWISH BROWN (10YR 7/6) MOIST, MEDIUM DENSE			
24										D.O. ABOVE, NO GRAVEL			
25	10	2426	4/8/17	90%	1438	NA	0.0/0.0						
26													
27	11	2628	5/7/9/10	90%	1445	NA	0.0/0.0			SAND, <del>STAY TO</del> <sup>SS</sup> FINE GRAINED ABUNDANT FINES, YELLOWISH BROWN (10YR4/6), WET, MEDIUM DENSE		V	
28										PROBABLY AS ABOVE,			
29										AUGER ONLY			
30		2832											
31			AUGER ONLY										
32										TOTAL DEPTH = 32'			

Key

S/B = Sample reading / Background reading

NA = not analyzed

holelog2.dwg

## Borehole Log

Project Name: 110TH FIGHTER GROUP, MIANG						Project Number: 948901	
Borehole Location: SITE 1, FUEL TANK FARM						Borehole No: BC1-MW2 Sheet 1 of 2	
Drilling Agency: STEARNS						Driller: MIKE HEFFERN	
Drilling Equipment: CME 550						Date Started: 14 DEC 94 Total Depth (feet): 30.2	
Drilling Method: HOLLOW STEM AUGER						Date Finished: 14 DEC 94 Depth To Bedrock (feet): NA	
Drilling Fluid: NA						Number of Samples: 4 Depth to Water (feet): 25.6	
Completion Information: <i>Completed as monitoring well</i>						Borehole Diameter (in): <sup>7.25</sup> 8.25 <del>8.25</del> Elevation and Datum:	
						Logged By: S. SMITH	
						Checked By: JSS Date: 6/3/95	

Depth (feet)	Sample				Field Analysis		LOG		Lithologic Description	Remarks
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B	Graphic		
1					1312				AUGER ONLY	GRASSY SURFACE
2										
3			AUGER			NA				
4										
5										
6	1		23-4-4	90%	1318	NA	0/0		SP	SAND, FINE TO MEDIUM GRAINED, TRACE FINE GRAVEL, DARK YELLOWISH BROWN (10YR 4/6), MOIST, LOOSE  BC1MW20507 (Sample 1.d.)
7										
8			AUGER			NA				
9										
10										
11	2		4-4-4-4	75%	1325	NA	0/0		SP	D.O. ABOVE (NO. 1)  BC1MW21012 (Sample 1.d.)
12										
13			AUGER			NA				
14										
15										

Key

S/B = Sample reading / Background reading

NA = not analyzed

holelog1.dwg



## Borehole Log

Project Name: 110TH FG, MIANG										Project Number: 9A8901			
Borehole Location: SITE 1, FUEL TANK FARM										Borehole No: BCI-HW2		Sheet 2 of 2	
Depth (feet)	Sample					Field Analysis		LOG		Checked By:	Date:		
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B	Graphic	USCS or Rock Type	Lithologic Description	Remarks		
16	3		9-11-15	85%	1333	NA	0/0			SAND, MEDIUM TO COARSE GRAINED W/FINE GRAVEL, MOTTLED YELLOWISH BROWN AND DARK YELLOWISH BROWN (10% 25/6 AND 4/6)	BCIMW21517 (Sample 1d)		
17										MOIST, MEDIUM DENSE			
18			AUGER			NA				AUGER ONLY, 17-20FT, PROBABLY AS ABOVE			
19													
20													
21	A		14-19-17	60%	1337	NA	0/0			D.O. ABOVE (NO. 3)	BCIMW22022 (Sample 1d)		
22										AUGER ONLY, 22-30FT			
23											ROUGH DRILLING APPROX 22-27FT		
24													
25													
26											HYDROCARBON ODOR NOTED FROM CUTTINGS		
27													
28													
29													
30										TOTAL DEPTH = 30FT			

Key

S/B = Sample reading / Background reading

NA = not analyzed

holelog2.dwg

## Borehole Log

Project Name: 110TH FIGHTER GROUP, MIANG						Project Number: 948901			
Borehole Location: SITE 1, FUEL TANK FARM						Borehole No: BCI-MW3 (temporary well)			
Drilling Agency: STEARNS						Driller: MIKE HEFFERN			
Drilling Equipment: CME 550						Date Started: 15 DEC 94		Total Depth (feet): 30	
Drilling Method: HOLLOW STEM AUGER						Date Finished: 15 DEC 94		Depth To Bedrock (feet): NA	
Drilling Fluid: NA						Number of Samples: NA		Depth to Water (feet): 24.7	
Completion Information: BOREHOLE ABANDONED AFTER COLLECTION OF GROUNDWATER SAMPLE						Borehole Diameter (in): 7.25		Elevation and Datum:	
						Logged By: S. SMITH			
						Checked By: JSB		Date: 4/3/95	

Depth (feet)	Sample					Field Analysis		LOG		Lithologic Description	Remarks
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B	Graphic	USCS or Rock Type		
1										SAND, FINE TO MEDIUM GRAINED, TRACE GRAVEL, DARK YELLOWISH BROWN (10YR 4/4) MOIST, LOOSE	
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											

Key

S/B = Sample reading / Background reading

NA = not analyzed

holelog1.dwg

## Borehole Log

Project Name: 110TH FIGHTER GROUP, MIANG										Project Number: 948901			
Borehole Location: SITE 1, FUEL TANK FARM										Borehole No: BCI-MWT (temporary well)		Sheet 2 of 2	
Depth (feet)	Sample				Field Analysis		LOG		Checked By: XSO	Date: 6/3/95			
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B	Graphic	USCS or Rock Type	Lithologic Description	Remarks		
17											ROUGH DRILLING		
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30										TOTAL DEPTH = 30'			

Key

S/B = Sample reading / Background reading

NA = not analyzed

holelog2.dwg

## Borehole Log

Project Name: 110TH FIGHTER GROUP, MIANG						Project Number: 948901	
Borehole Location: PARADE GROUNDS				Borehole No: BC-MWG- JSB 3/11/95		Sheet 1 of 3	
Drilling Agency: STEARNS				Driller: MIKE HEFFERN			
Drilling Equipment: CHE 550				Date Started: 15 DEC 94		Total Depth (feet): 40.0	
Drilling Method: HOLLOW STEM AUGER				Date Finished: 15 DEC 94		Depth To Bedrock (feet): NA	
Drilling Fluid: NA				Number of Samples: NA		Depth to Water (feet): 32.90	
Completion Information: COMPLETED AS FLUSH MOUNT MONITORING WELL				Borehole Diameter (in): 7.25		Elevation and Datum:	
				Logged By: S. SMITH			
		Checked By: JSB		Date: 6/3/95			

Depth (feet)	Sample			Field Analysis		LOG		Lithologic Description	Remarks
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm)* S/B		
1	NA	0005	AUGER ONLY	NA	1149	NA	0.0/0.0		
2									
3									
4									
5	NA	0510	AUGER ONLY	NA	1154	NA	0.0/0.0		
6									
7									
8									
9	NA	1015	AUGER ONLY	NA	1157	NA	0.0/0.0		
10									
11									
12									
13	NA								
14									
15									

Key

S/B = Sample reading / Background reading

NA = not analyzed

holelog1.dwg

\*PID READINGS TAKEN FROM CUTTINGS @ SURFACE

## Borehole Log

Project Name: 110TH FIGHTER GROUP, MIANG										Project Number: 948901			
Borehole Location: PARADE GROUNDS										Borehole No: BC-MW16		Sheet 2 of 3	
										Checked By: 843		Date: 6/3/95	
Depth (feet)	Sample					Field Analysis		LOG		Lithologic Description	Remarks		
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B	Graphic	USCS or Rock Type				
16	NA									D.O. ABOVE			
17	1159-55	1520	NA	NA	1159	NA	0.0/0.0			SAND, MEDIUM GRAINED W/ GRAVEL, YELLOWISH BROWN (10 YR 5/6), MOIST, LOOSE			
18													
19													
20										D.O. ABOVE			
21													
22	NA	2025	NA	NA	1203	NA	0.0/0.0						
23													
24													
25										D.O. ABOVE			
26													
27	NA	2530	NA	NA	1205	NA	0.0/0.0						
28													
29													
30										D.O. ABOVE, FINE TO MEDIUM GRAINED, TRACE GRAVEL			
31													
32	NA	3035	NA	NA	1208	NA	0.0/0.0						
33													
34													
35													

Key

S/B = Sample reading / Background reading

NA = not analyzed

holelog2.dwg

# Borehole Log

[illegible]

### Key

S/B = Sample reading / Background reading

NA = not analyzed

## holelog2.dwg

# Borehole Log

Project Name: 110 <sup>th</sup> FG, MICH ANG; Battle Creek, Mich		Project Number: 948901-08	
Borehole Location: Site 1: Former Fuel Tank		Borehole No. BC1B1	Sheet 1 of 2
Drilling Agency: EarthTech Area		Driller: B. Bell	
Drilling Equipment: Geoprobe		Date Started: 11/06/94	Total Depth (feet): 27
Drilling Method: Geoprobe		Date Finished: 11/07/94	Depth to Bedrock (feet): NA
Drilling Fluid: NA		Number of Samples: 6	Depth to Water (feet): ~25
Completion Information: Filled w/ granular bentonite		Borehole Diameter (in): 1 1/16	Elevation and Datum: NA
		Logged by: A. Fox	
		Checked by: JJB	Date: 6/3/98

Depth (feet)	Sample				Field Analysis		LOG		Lithologic Description	Remarks
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B*	PID (ppm) S/B*	Graphic		
0	BC1B10001	00'-01'	NA	100%	0930	NA	NA			
1									1'-5', Drive only	
5	BC1B10507	05'-07'	NA	NA	1320	NA	3.2/0	SW	Sand with minor gravel, coarse-med. grained, brown-gray-brown, loose, moist-very moist	Slight hydrocarbon odor
7									7'-10', Drive only	
10	BC1B10102	10'-12'	NA	NA	1350	NA	9.3/0	SW	Sand with gravel, coarse grained, trace fines, gray brown, loose, moist	Slight hydrocarbon odor
12									12'-15' Drive only	
15										

Key

\* S/B = Sample reading / background reading;

NA = not analyzed

## Borehole Log

Project Name: <i>110<sup>th</sup> FG, MICH ANG, Battle Creek, Mich</i>										Project Number: <i>948901-08</i>	
Borehole Location: <i>Site 1: Former Fuel Tank Area</i>								Borehole No: <i>BC1B1</i>		Sheet <i>2</i> of <i>2</i>	
Depth (feet)	Sample				Field Analysis		LOG		Checked By: <i>YSS</i>	Date: <i>6/3/95</i>	
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B	Graphic	USCS or Rock Type	Lithologic Description	Remarks
15	<i>BC1B11517</i>	<i>15' - 17'</i>	<i>NA</i>	<i>NA</i>	<i>1410</i>	<i>NA</i>	<i>7.0/0</i>		<i>SW</i>	<i>sand with minor gravel, fine-coarse grained, gray-brown, loose, moist</i>	<i>Slight hydrocarbon odor</i>
17										<i>17' - 20', Drive only</i>	
20	<i>BC1B12022</i>	<i>20' - 22'</i>	<i>NA</i>	<i>NA</i>	<i>1438</i>	<i>NA</i>	<i>&gt;2500</i>		<i>SM</i>	<i>silty sand, fine to v. fine sand, Lt. brown, cohesive, moist</i>	<i>Slight hydrocarbon odor</i>
22										<i>22' - 25', Drive only</i>	
25	<i>BC1B12527</i>	<i>25' - 27'</i>	<i>NA</i>	<i>NA</i>	<i>1455</i>	<i>NA</i>	<i>25/0</i>		<i>SP</i>	<i>sand, well-sorted, brown, loose, wet</i>	<i>slight hydrocarbon odor</i>
27										<i>TD = 27'</i>	

Key

S/B = Sample reading / Background reading

NA = not analyzed

holelog2.dwg



# Borehole Log

Project Name: 110 <sup>th</sup> FG, MICH ANG; Battle Creek, Mich										Project Number: 948901-08			
Borehole Location: Site 1: Former Fuel Tank										Borehole No. BC1B2		Sheet 1 of 2	
Drilling Agency: EarthTech Area										Driller: B. Bell			
Drilling Equipment: Geoprobe										Date Started: 11/06/94		Total Depth (feet): 22	
Drilling Method: Geoprobe										Date Finished: 11/07/94		Depth to Bedrock (feet): NA	
Drilling Fluid NA										Number of Samples: 5		Depth to Water (feet): NA	
Completion Information: Filled w/ granular bentonite										Borehole Diameter (in): 1 1/16		Elevation and Datum: NA	
										Logged by: A. Fox			
Checked by: JSD										Date: 6/3/95			

Depth (feet)	Sample					Field Analysis		LOG		Lithologic Description	Remarks
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B	Graphic	USCS or Rock Type		
0	BC1B2/0001	00'-01'	NA	NA	0900	NA	0%		SW	Sand and gravel, dk. brown, moist	No Odor
1										1'-5', Drive only	
5	BC1B2/0507	05'-07'	NA	NA	1130	NA	0.0/0.0		SW	Sand, minor v. coarse sand to fine gravel, yellow brown, v. moist	
7										7'-10', Drive only	
10	BC1B2/1012	10'-12'	NA	NA	1140	NA	10.0%		SW	Sand, coarse - v. coarse grained with v. fine - fine gravel, v. little fines, Lt. brown-brown, loose, moist	Slight hydrocarbon odor
12										12'-15', Drive only	
15											

Key

\* S/B = Sample reading / background reading;

NA = not analyzed

## Borehole Log

Project Name: <b>110<sup>th</sup> FG, MICH ANG, BattleCreek, Mich</b>										Project Number: <b>948901-08</b>	
Borehole Location: <b>Site1: Former Fuel Tank Area</b>								Borehole No: <b>BC1B2</b>		Sheet <b>2</b> of <b>2</b>	
Depth (feet)	Sample				Field Analysis		LOG		Checked By: <b>830</b>	Date: <b>3/98</b>	
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B	Graphic	USCS or Rock Type	Lithologic Description	Remarks
15	<b>BC1B21517</b>	<b>15'-17'</b>	<b>NA</b>	<b>NA</b>	<b>1150</b>	<b>NA</b>	<b>300/0</b>		<b>SM</b>	<b>Sand, fine-v. fine with (17-16') minor silt and clay, (16'-15') Coarse grained, well-sorted, loose, v. moist</b>	<b>Hydrocarbon Odor</b>
17											
20	<b>BC1B22022</b>	<b>20'-22'</b>	<b>NA</b>		<b>1200</b>	<b>NA</b>	<b>20/0</b>		<b>SM</b>	<b>(22-21.5') v. fine sand with silt, gray, gray brown, moist-v. moist, cohesive; (21.5-20) sand, fine grained, well-sorted, moist</b>	
22											
										<b>TD = 22'</b>	

Key

S/B = Sample reading / Background reading

NA = not analyzed

holelog2.dwg

# Borehole Log

Project Name: 110 <sup>th</sup> FG, MICH ANG; Battle Creek, Mich										Project Number: 948901-08	
Borehole Location: Site 1: Former Fuel Tank								Borehole No. BC1B3		Sheet 1 of 2	
Drilling Agency: EarthTech Area								Driller: B. Bell			
Drilling Equipment: Geoprobe								Date Started: 11/07/94		Total Depth (feet): 22	
Drilling Method: Geoprobe								Date Finished: 11/08/94		Depth to Bedrock (feet): NA	
Drilling Fluid NA								Number of Samples: 5		Depth to Water (feet): NA	
Completion Information: Filled w/ granular bentonite								Borehole Diameter (in): 1 1/16		Elevation and Datum: NA	
								Logged by: A. Fox			
								Checked by: JSB		Date: 6/3/95	

Depth (feet)	Sample			Field Analysis		LOG		Lithologic Description	Remarks		
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B*	PID (ppm) S/B*			Graphic	USCS or Rock Type
0	BC1B3001	00'-01'	NA	100%	10/0	NA	0%		SW	sand and gravel, brown, moist	No Odor
1										1'-5', Drive only	
5	BC1B30507	05'-07'	NA	NA	1630	NA	2.5/0.0		SC	Sandy clay, brown to dark brown, fine grained, moist	Hydrocarbon odor
7										7'-10', Drive only	
10	BC1B31012	10'-12'	NA	NA	1650	NA	2.1/0.0		SP	Sand, med. grained, brown to orange brown, well-sorted, loose, moist	Petroleum odor
12										12'-15', Drive only	

15  
Key

\* S/B = Sample reading / background reading;

NA = not analyzed

## Borehole Log

Project Name: <b>110<sup>th</sup> FG, MICH ANG; Battle Creek, Mich</b>										Project Number: <b>948901-08</b>	
Borehole Location: <b>Site 1: Former fuel tank area</b>								Borehole No: <b>BC/B3</b>		Sheet <b>2</b> of <b>2</b>	
Depth (feet)	Sample					Field Analysis		LOG		Checked By:	Date:
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B	Graphic	USCS or Rock Type	Lithologic Description	Remarks
15	BC/B3/517	15' - 17'	NA	30%	1705	NA	1.5/0.0		SW	sand with gravel, med. grained, brown, poorly sorted, moist	Petroleum odor
17										17' - 20' Drive only	
20	BC/B3/2022	20' - 22'	NA	NA	1715	NA	79.0/0.1		SP	sand, med. grained, brown to gray, moist	Petroleum Odor
22										TD = 22'	

Key

S/B = Sample reading / Background reading

NA = not analyzed

holelog2.dwg

# Borehole Log

Project Name: 110 <sup>th</sup> FG, MICH ANG; Battle Creek, Mich										Project Number: 948901-08	
Borehole Location: Site 1: Former Fuel Tank						Borehole No. BC184		Sheet 1 of 2			
Drilling Agency: EarthTech						Area		Driller: B. Bell			
Drilling Equipment: Geoprobe						Date Started: 11/06/94		Total Depth (feet): 20			
Drilling Method: Geoprobe						Date Finished: 11/09/94		Depth to Bedrock (feet): NA			
Drilling Fluid: NA						Number of Samples: 5		Depth to Water (feet): NA			
Completion Information: Filled w/ granular bentonite						Borehole Diameter (in): 1 1/16		Elevation and Datum: NA			
						Logged by: A. Fox					
						Checked by: JSS		Date: 6/31/95			

Depth (feet)	Sample					Field Analysis		LOG		Lithologic Description	Remarks
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B	Graphic	USCS or Rock Type		
0	BC1840001	00'-01'	NA	100%	0900	NA	NA		SP	sand, med. grained, moist	No Odor
1										1'-5', Drive only	
5	BC1840507	05'-07'	NA	NA	1535	NA	0.6%		SW	sand with minor gravel and fines, med-coarse grained, brown, moist	No Odor
7										7'-10', Drive only	
10	BC1841012	10'-12'	NA	NA	1545	NA	2.9%		SW	sand, fine gravel, coarse sand, brown gray-brown, loose, moist	No Odor
12										12'-15', Drive only	
15											

Key

\* S/B = Sample reading / background reading;

NA = not analyzed

## Borehole Log

Project Name: <b>110<sup>th</sup> FG, MICH ANG; Battle Creek, MICH</b>										Project Number: <b>948901-08</b>	
Borehole Location: <b>Site 1: Former Fuel Tank Area</b>							Borehole No: <b>BC1B4</b>		Sheet <b>2</b> of <b>2</b>		
Depth (feet)	Sample				Field Analysis		LOG		Checked By: <b>JSO</b>	Date: <b>6/3/95</b>	
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B	Graphic	USCS or Rock Type	Lithologic Description	Remarks
15	BC1B41517	15' - 17'	NA	NA	1610	NA	2.5/0			Crushed rock and soil	
17										17' - 20', Drive only	
20	BC1B42022	20' - 22'	NA	0%	1630	NA	NA				Sampler was bent
22										TD = <del>22</del> 20' JSB 2/19/96	

Key

S/B = Sample reading / Background reading

NA = not analyzed

holelog2.dwg

# Borehole Log

Project Name: 110 <sup>th</sup> FG, MICH ANG; Battle Creek, Mich										Project Number: 948901-08	
Borehole Location: Site 1: Former Fuel Tank							Borehole No. BC1B5		Sheet 1 of 2		
Drilling Agency: EarthTech Area							Driller: B. Bell				
Drilling Equipment: Geoprobe							Date Started: 11/07/94		Total Depth (feet): 27		
Drilling Method: Geoprobe							Date Finished: 11/09/94		Depth to Bedrock (feet): NA		
Drilling Fluid NA							Number of Samples: 6		Depth to Water (feet): ~25 ft.		
Completion Information: Filled w/ granular bentonite							Borehole Diameter (in): 1 1/16		Elevation and Datum: NA		
							Logged by: A. Fox				
							Checked by: JBB		Date: 6/3/95		

Depth (feet)	Sample					Field Analysis		LOG		Lithologic Description	Remarks
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B*	PID (ppm) S/B*	Graphic	USCS or Rock Type		
0	BC1B50001	00-01'	NA	100%	0935	NA	NA		SP	Sand, brown, med. grained, moist, well-sorted, cohesive	No Odor
1										1'-5', Drive only	
5	BC1B50507	05'-07'	NA	NA	1015	NA	0/0		SP	Sand, med.-coarse grained with trace fines, brown, well-sorted, loose, moist	No Odor
7										7'-10', Drive only	
10	BC1B51012	10'-12'	NA	NA	1050	NA	0/0		SP	Sand, brown, well-sorted, moist, loose	No Odor
12										12'-15', Drive only	
15											

Key

\* S/B = Sample reading / background reading;

NA = not analyzed

## Borehole Log

Project Name: <b>110<sup>th</sup> FG, MICH ANG, Battle Creek, MICH</b>										Project Number: <b>948901-08</b>	
Borehole Location: <b>Site 1: Former Fuel Tank Area</b>								Borehole No: <b>BC1B5</b>		Sheet <b>2</b> of <b>2</b>	
Depth (feet)	Sample				Field Analysis		LOG		Checked By: <b>JBB</b>	Date: <b>6/3/95</b>	
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B	Graphic	USCS or Rock Type	Lithologic Description	Remarks
15	BC1B51517	15'-17'	NA	NA	1110	NA	0/0		SP	sand, brown, well-sorted, moist, loose	No Odor
17										17'-20', Drive only	
20	BC1B52022	20'-22'	NA	NA	1140	NA	0/0		SW	sand, Lt. brown, some gravel, loose	No Odor
22										22'-25', Drive only	
25	BC1B52527 BC1B52527	25'-27'	NA	NA	1210	NA	25270 = 241/0 4527 = 28.5/0		SW	sand, coarse, brown, poorly-sorted, loose, saturated	Fuel Odor
27										TD = 27'	

Key

S/B = Sample reading / Background reading

NA = not analyzed

holelog2.dwg



# Borehole Log

Project Name: 110 <sup>th</sup> FG, MICH ANG; Battle Creek, Mich										Project Number: 948901-08			
Borehole Location: Site 1: Former Fuel Tank										Borehole No. BC186		Sheet 1 of 1	
Drilling Agency: EarthTech Area										Driller: B. Bell			
Drilling Equipment: Geoprobe										Date Started: 11/08/94		Total Depth (feet): 12	
Drilling Method: Geoprobe										Date Finished: 11/08/94		Depth to Bedrock (feet): NA	
Drilling Fluid: NA										Number of Samples: 1		Depth to Water (feet): NA	
Completion Information: Filled w/ granular bentonite										Borehole Diameter (in): 1 1/16		Elevation and Datum: NA	
										Logged by: A. Fox			
										Checked by: J3B		Date: 6/3/95	

Depth (feet)	Sample					Field Analysis		LOG		Lithologic Description	Remarks
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B*	PID (ppm) S/B*	Graphic	USCS or Rock Type		
0										0-10', Drive only	
10	BC186/012	10'-12'	NA	NA	0900	NA	10/0		SP	Sand, med. grained, brown, well-sorted, loose, moist	
12										TD = 12'	

Key

\* S/B = Sample reading / background reading;

NA = not analyzed

# Borehole Log

Project Name: 110 <sup>th</sup> FG, MICH ANG; Battle Creek, Mich										Project Number: 948901-08	
Borehole Location: Site 1: Former Fuel Tank								Borehole No. BC1B7		Sheet 1 of 2	
Drilling Agency: EarthTech Area								Driller: B. Bell			
Drilling Equipment: Geoprobe								Date Started: 11/09/94		Total Depth (feet): 18	
Drilling Method: Geoprobe								Date Finished: 11/09/94		Depth to Bedrock (feet): NA	
Drilling Fluid NA								Number of Samples: 4		Depth to Water (feet): NA	
Completion Information: Filled w/ granular bentonite								Borehole Diameter (in): 1 1/16		Elevation and Datum: NA	
								Logged by: A. Fox			
								Checked by: JSS		Date: 6/1/96	

Depth (feet)	Sample			Field Analysis		LOG		Lithologic Description	Remarks		
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B			Graphic	USCS or Rock Type
0	BC1B70001	00'-01'	NA	100%	1455	NA	NA		SC	sandy clay, v. small amount of gravel, brown, cohesive, moist	No Odor
1										1'-5', Drive only	
5	BC1B70507	05'-07'	NA	50%	1130	NA	13/11.8		SW	Sand, med. - coarse grained, trace fines, loose, moist	No Odor
7										7'-10', Drive only	
10	BC1B71012	10'-12'	NA	40%	1145	NA	6.6/4.4		SW	Sand with gravel, med. - v. coarse grained, brown - Lt. brown, loose, moist	No Odor
12										12'-15', Drive only	
15											

Key

S/B = Sample reading / background reading;

NA = not analyzed

holelog2.dwd

# Borehole Log

Project Name: 110 <sup>th</sup> FG, MICH ANG; Battle Creek, Mich										Project Number: 948901-08	
Borehole Location: Site 1: Former Fuel Tank						Borehole No. BC138			Sheet 1 of 2		
Drilling Agency: EarthTech Area						Driller: B. Bell					
Drilling Equipment: Geoprobe						Date Started: 11/07/94		Total Depth (feet): 22			
Drilling Method: Geoprobe						Date Finished: 11/09/94		Depth to Bedrock (feet): NA			
Drilling Fluid: NA						Number of Samples: 5		Depth to Water (feet): NA			
Completion Information: Filled w/ granular bentonite						Borehole Diameter (in): 1 1/4		Elevation and Datum: NA			
						Logged by: A. Fox					
						Checked by: JBB		Date: 6/3/95			

Depth (feet)	Sample			Field Analysis		LOG		Lithologic Description	Remarks		
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B			Graphic	USCS or Rock Type
0	BC138 0001	00'-01'	NA	100%	11a5	NA	NA		SC	sandy clay, fine grained, brown, cohesive	No Odor
1										1'-5', Drive only	
5	BC180507	05'-07'	NA	NA	1515	NA	0/0		SP	Sand, med. grained, brown, well-sorted, loose, moist	Slight hydrocarbon odor
7										7'-10', Drive only	
10	BC188101A	10'-12'	NA	NA	1535	NA	0/0		SP	Sand, med. grained, brown, well-sorted, loose, moist	
12										12'-15', Drive only	
15											

Key

\* S/B = Sample reading / background reading;

NA = not analyzed

Project Name: 110<sup>th</sup> F6, MICH ANG; Battle Creek, MICH

Project Number: 948901-08

Borehole Location: Site 1: Former Fuel Tank Area

Borehole No: BC1B 8

Sheet 2 of 2

Checked By: XSB

Date: 6/3/95

Depth (feet)	Sample					Field Analysis		LOG		Checked By: <u>JSB</u>	Date: <u>6/3/95</u>
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B	Graphic	USCS or Rock Type	Lithologic Description	Remarks
15	BC1B891517	15'-17'	NA	NA	1550	NA	0/0		SW	Sand, med. grained with a few pieces of gravel, brown, loose, moist	
17										17'-20', Drive only	
20	BC1B82022	20'-22'	NA	NA	1610	NA	0/0		SP	sand, fine grained, v. well- sorted, brown, loose, slightly moist	No Odor
22										TD = 22'	

Key

S/B = Sample reading / Background reading

NA = not analyzed

holelog2.dwg

## Borehole Log

Project Name: 110 <sup>th</sup> FG, MICH ANG; Battle Creek, Mich						Project Number: 948901-08					
Borehole Location: Site 1: Former Fuel Tank						Borehole No. BC1B9			Sheet 1 of 2		
Drilling Agency: EarthTech Area						Driller: B. Bell					
Drilling Equipment: Geoprobe						Date Started: 11/09/94			Total Depth (feet): 22		
Drilling Method: Geoprobe						Date Finished: 11/09/94			Depth to Bedrock (feet): NA		
Drilling Fluid NA						Number of Samples: 5			Depth to Water (feet): NA		
Completion Information: Filled w/ granular bentonite						Borehole Diameter (in): 1 1/16			Elevation and Datum: NA		
						Logged by: A. Fox					
						Checked by: JSB			Date: 6/3/95		

Depth (feet)	Sample					Field Analysis		LOG		Lithologic Description	Remarks
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B*	PID (ppm) S/B*	Graphic	USCS or Rock Type		
0	BC1B90001	00'-01'	NA	100%	1520	NA	NA		SW	sand, med. grained, brown, poorly sorted, moist	No Odor
1										1'-5', Drive only	
5	BC1B90507	05'-07'	NA	NA	1630	NA	NA		SC	sandy clay, fine grained, v. cohesive	No Odor
7										7'-10', Drive only	
10	BC1B91012	10'-12'	NA	30%	1645	NA	NA		SC	sandy clay to just sand, fine to med. grained, brown, moist	No Odor
12										12'-15', Drive only	
15											

Key

\* S/B = Sample reading / background reading;

NA = not analyzed

## Borehole Log

Project Name: 110<sup>th</sup> FG, MICH ANG; Battle Creek, MICH

Project Number: 948901-08

Borehole Location: Site 1: Former fuel tank area

Borehole No: BC1B9

Sheet 2 of 2

Checked By: JSB

Date: 6/3/95

Depth (feet)	Sample					Field Analysis		LOG		Lithologic Description	Remarks
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B	Graphic	USCS or Rock Type		
15	BC1B9/517	15'-17'	NA	NA	1730	NA	NA		SP	Sand, fine grained, brown, well-sorted, moist	No Odor
17										17'-20', Drive only	
20	BC1B9/2022	20'-22'	NA	NA	1720	NA	NA		SP	Sand, fine grained, brown, well-sorted, moist	No Odor
22										TD = 22'	

Key

S/B = Sample reading / Background reading

NA = not analyzed

holelog2.dwg

# Borehole Log

Project Name: 110 <sup>th</sup> FG, MICH ANG; Battle Creek, Mich						Project Number: 948901-08					
Borehole Location: Site 1: Former Fuel Tank						Borehole No. BC1B11			Sheet 1 of 2		
Drilling Agency: EarthTech Area						Driller: B. Bell					
Drilling Equipment: Geoprobe						Date Started: 11/09/94			Total Depth (feet): 23		
Drilling Method: Geoprobe						Date Finished: 11/10/94			Depth to Bedrock (feet): NA		
Drilling Fluid: NA						Number of Samples: 5			Depth to Water (feet): NA		
Completion Information: Filled w/ granular bentonite						Borehole Diameter (in): 1 1/16			Elevation and Datum: NA		
						Logged by: A. Fox					
						Checked by: JSB			Date: 6/1/95		

Depth (feet)	Sample					Field Analysis		LOG		Lithologic Description	Remarks
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B	Graphic	USCS or Rock Type		
0	BC1B11 0001	00'-01'	NA	NA	1030	NA	NA		SC	clayey sand, gravel and organics, moist, cohesive	No Odor
1										1'-5', Drive only	
5	BC1B11 0507	05'-07'	NA	10%	1440	NA	2.5/1.8		SW	sand, med-coarse grained, brown, loose, moist	No Odor
7										7'-10', Drive only	
10	BC1B11 1012	10'-12'	NA	90%	1455	NA	0.7/0		SW	sand with gravel, med-coarse grained, brown-Lt. brown, loose, moist	No Odor
12										12'-15' Drive only	
15											

Key

\* S/B = Sample reading / background reading;

NA = not analyzed



## Borehole Log

Project Name: <b>110<sup>th</sup> FG, MICH ANG; BATTLECREEK, MICH</b>										Project Number: <b>948901-08</b>	
Borehole Location: <b>Site 1: Former fuel tank area</b>								Borehole No: <b>BC1B11</b>		Sheet <b>2</b> of <b>2</b>	
Depth (feet)	Sample					Field Analysis		LOG		Checked By: <b>830</b>	Date: <b>6/3/98</b>
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B	Graphic	USCS or Rock Type	Lithologic Description	Remarks
15	BC1B11/517	15'-17'	NA	NA	1510	NA	0.3/0		SM	sand with silt, v. fine - fine grained, brown-yellow brown, cohesive, moist	No Odor
17										17'-19'; Drive only	
19	BC1B11/1923/BC1B11/1923 D	19'-23'	NA	80% and 70%	1540	NA	0.7/0		SW	sand, v. fine - med. grained, minor fines, brown, loose - cohesive, moist	No Odor
23										TD = 23'	

Key

S/B = Sample reading / Background reading

NA = not analyzed

holelog2.dwg

# Borehole Log

Project Name: 110 <sup>th</sup> FG, MICH ANG; Battle Creek, Mich										Project Number: 948901-08	
Borehole Location: Site 1: Former Fuel Tank						Borehole No. BC1B12			Sheet 1 of 2		
Drilling Agency: EarthTech Area						Driller: B. Bell					
Drilling Equipment: Geoprobe						Date Started: 11/07/93			Total Depth (feet): 22		
Drilling Method: Geoprobe						Date Finished: 11/09/93			Depth to Bedrock (feet): NA		
Drilling Fluid: NA						Number of Samples: 5			Depth to Water (feet): NA		
Completion Information: Filled w/ granular bentonite						Borehole Diameter (in): 1 1/16			Elevation and Datum: NA		
						Logged by: A. Fox					
						Checked by: JJB			Date: 6/3/95		

Depth (feet)	Sample					Field Analysis		LOG		Lithologic Description	Remarks
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B	Graphic	USCS or Rock Type		
0	BC1B12 0001	00-01'	NA	100%	1425	NA	NA		SC	v. sandy clay, fine grained, brown, somewhat cohesive, moist	No Odor
1										1'-5', Drive only	
5	BC1B12 0507	05'-07'	NA	NA	1335	NA	0%		SP	sand, brown, well-sorted, moist, loose	No Odor
7										7'-10', Drive only	
10	BC1B12 1012	10'-12'	NA	50%	1350	NA	NA		SW	sand, med. grained, v. small amount of gravel, poorly-sorted, Lt. brown, loose	No Odor
12										12'-15', Drive only	
15											

Key

\* S/B = Sample reading / background reading;

NA = not analyzed

Project Name: <b>110<sup>th</sup> FG, MICH ANG; Battle Creek, MICH</b>										Project Number: <b>948901-08</b>	
Borehole Location: <b>Site 1: Former Fuel Tank Area</b>								Borehole No: <b>BC1B12</b>		Sheet <b>2</b> of <b>2</b>	
Depth (feet)	Sample					Field Analysis		LOG		Checked By: <b>JSB</b>	Date: <b>6/3/95</b>
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B	Graphic	USCS or Rock Type	Lithologic Description	Remarks
15	BC1B12/1517	15'-17'	NA	NA	1430	NA	0/0		SP	Sand, fine grained, brown, well-sorted, v. moist to moist, loose	No Odor
17										17'-20', Drive only	
20	BC1B12/2022	20'-22'	NA	NA	1445	NA	0/0		SP	Sand, med. grained, brown, well-sorted, loose, slightly moist	No Odor
22										TD = 22'	

Key

S/B = Sample reading / Background reading

NA = not analyzed

holelog2.dwg

# Borehole Log

Project Name: 110 <sup>th</sup> FG, MICH ANG; Battle Creek, Mich		Project Number: 948901-08	
Borehole Location: Site 1: Former Fuel Tank		Borehole No. BC1B13	Sheet 1 of 1
Drilling Agency: EarthTech Area		Driller: B. Bell	
Drilling Equipment: Geoprobe		Date Started: 11/08/94	Total Depth (feet): 12
Drilling Method: Geoprobe		Date Finished: 11/08/94	Depth to Bedrock (feet): NA
Drilling Fluid: NA		Number of Samples: 1	Depth to Water (feet): NA
Completion Information: Filled w/ granular bentonite		Borehole Diameter (in): 1 1/16	Elevation and Datum: NA
		Logged by: A. Fox	
		Checked by: JSD	Date: 6/3/95

Depth (feet)	Sample				Field Analysis		LOG			Lithologic Description	Remarks
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B*	PID (ppm) S/B*	Graphic	USCS or Rock Type		
0										0-10', Drive only	
10	BC1B13/012	10'-12'	NA	20%	08/5	NA	NA		SP	Sand, med.-coarse grained, minor trace fines, brown, loose, moist	No Odor
12										TD = 12	
15											

Key

\* S/B = Sample reading / background reading;

NA = not analyzed

# Borehole Log

Project Name: 110 <sup>th</sup> FG, MICH ANG; Battle Creek, Mich		Project Number: 948901-08	
Borehole Location: Site 1: Former Fuel Tank		Borehole No. BC1B14	Sheet 1 of 1
Drilling Agency: EarthTech Area		Driller: B. Bell	
Drilling Equipment: Geoprobe		Date Started: 11/08/94	Total Depth (feet): 12
Drilling Method: Geoprobe		Date Finished: 11/08/94	Depth to Bedrock (feet): NA
Drilling Fluid: NA		Number of Samples: 1	Depth to Water (feet): NA
Completion Information: Filled w/ granular bentonite		Borehole Diameter (in): 1 1/16	Elevation and Datum: NA
		Logged by: A. Fox	
		Checked by: ysb	Date: 4/3/95

Depth (feet)	Sample					Field Analysis		LOG		Lithologic Description	Remarks
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B*	PID (ppm) S/B*	Graphic	USCS or Rock Type		
0										0-10', Drive only	
10											
12	BC1B14/12	10'-12'	NA	40%	0845	NA	0/0		SW	sand, med-coarse grained, some gravel, brown, loose, v. moist	No Odor
15										TD = 12	

Key

\* S/B = Sample reading / background reading;

NA = not analyzed

# Borehole Log

Project Name: 110 <sup>th</sup> FG, MICH ANG; Battle Creek, Mich		Project Number: 948901-08	
Borehole Location: Site 1: Former Fuel Tank Area		Borehole No. BC1B15	Sheet 1 of 1
Drilling Agency: EarthTech		Driller: B. Bell	
Drilling Equipment: Geoprobe		Date Started: 11/08/94	Total Depth (feet): 12
Drilling Method: Geoprobe		Date Finished: 11/08/94	Depth to Bedrock (feet): NA
Drilling Fluid: NA		Number of Samples: 1	Depth to Water (feet): NA
Completion Information: Filled w/ granular bentonite		Borehole Diameter (in): 1 1/16	Elevation and Datum: NA
		Logged by: A. Fox	
		Checked by: JB	Date: 6/3/95

Depth (feet)	Sample					Field Analysis		LOG		Lithologic Description	Remarks
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B*	PID (ppm) S/B*	Graphic	USCS or Rock Type		
0										0-10', Drive only	
1											
2											
3											
4											
5											
6											
7											
8											
9											
10	BC1B15/01A	10' - 12'	NA	NA	0930	NA	240%		SP	sand, med. grained, brown, well-sorted, loose, moist	Hydrocarbon odor
12										TD=12	
15											

Key

\* S/B = Sample reading / background reading;

NA = not analyzed



# Borehole Log

Project Name: 110 <sup>th</sup> FG, MICH ANG; Battle Creek, Mich						Project Number: 948901-08					
Borehole Location: Site 1: Former Fuel Tank						Borehole No. BC1B17			Sheet 1 of 1		
Drilling Agency: EarthTech Area						Driller: B. Bell					
Drilling Equipment: Geoprobe						Date Started: 11/08/94			Total Depth (feet): 12		
Drilling Method: Geoprobe						Date Finished: 11/08/94			Depth to Bedrock (feet): NA		
Drilling Fluid: NA						Number of Samples: 1			Depth to Water (feet): NA		
Completion Information: Filled w/ granular bentonite						Borehole Diameter (in): 1 1/16			Elevation and Datum: NA		
						Logged by: A. Fox					
						Checked by: JSB			Date: 6/3/95		

Depth (feet)	Sample				Field Analysis		LOG		Lithologic Description	Remarks
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B	Graphic		
0									0-10', Drive only	
10	BC1B17101A	10'-12'	NA	NA	10/5	NA	2.5/1.2		SC	sandy clay, fine grained, brown, moist
12										TD=12'
15										

Key

\* S/B = Sample reading / background reading;

NA = not analyzed



# Borehole Log

Project Name: 110 <sup>th</sup> FG, MICH ANG; Battle Creek, Mich						Project Number: 948901-08					
Borehole Location: Site 1: Former Fuel Tank						Borehole No. BC1B18			Sheet 1 of 2		
Drilling Agency: EarthTech Area						Driller: B. Bell					
Drilling Equipment: Geoprobe						Date Started: 11/09/94			Total Depth (feet): 22		
Drilling Method: Geoprobe						Date Finished: 11/09/94			Depth to Bedrock (feet): NA		
Drilling Fluid: NA						Number of Samples: 4			Depth to Water (feet): NA		
Completion Information: Filled w/ granular bentonite						Borehole Diameter (in): 1 1/16			Elevation and Datum: NA		
						Logged by: A. Fox					
						Checked by: JSB			Date: 1/7/95		

Depth (feet)	Sample					Field Analysis		LOG		Lithologic Description	Remarks
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B	Graphic	USCS or Rock Type		
0										0-5', Drive only	
5	BC1B18 0507	05'-07'	NA	50%	0820	NA	24/5.1		SC	Sandy clay, gray-brown to gray	slight hydrocarbon odor
7										7'-10', Drive only	
10	BC1B18 1012	10'-12'	NA	NA	0855	NA	15/5.5		SC	clayey sand, brown-gray brown, loose, moist, sand with fines	slight hydrocarbon odor
12										12'-15', Drive only	
15											

Key

\* S/B = Sample reading / background reading;

NA = not analyzed

## Borehole Log

Project Name: 110<sup>th</sup> F6, MICH ANG; BATTLECREEK, MICH

Project Number: 948901-08

Borehole Location: Site 1: Former Fuel Tank Area

Borehole No: BC1B18

Sheet 2 of 2

Depth (feet)	Sample				Field Analysis		LOG		Checked By:	Date: 11/9/94	
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B	Graphic	USCS or Rock Type	Lithologic Description	Remarks
15	BC1B181517	15'-17'	NA	30%	0905	NA	62/11		SC	sandy clay, gray to gray brown	Hydrocarbon Odor
17										17'-20', Drive only	
20	BC1B182022	20'-22'	NA	NA	0920	NA	91/11		SW	sand, med-coarse grained, thin (0.2') silty clay lense, moist to very moist, loose	* lense in 21-22' interval * mod.-strong odor
22										TD = 22	

Key

S/B = Sample reading / Background reading

NA = not analyzed

holelog2.dwg

# Borehole Log

Project Name: 110 <sup>th</sup> FG, MICH ANG; Battle Creek, Mich										Project Number: 948901-08	
Borehole Location: Site 1: Former Fuel Tank							Borehole No. BC1819		Sheet 1 of 2		
Drilling Agency: EarthTech Area							Driller: B. Bell				
Drilling Equipment: Geoprobe							Date Started: 11/9/94		Total Depth (feet): 22		
Drilling Method: Geoprobe							Date Finished: 11/10/94		Depth to Bedrock (feet): NA		
Drilling Fluid: NA							Number of Samples: 5		Depth to Water (feet): NA		
Completion Information: Filled w/ granular bentonite							Borehole Diameter (in): 1 1/16		Elevation and Datum: NA		
							Logged by: A. Fox				
							Checked by: 830		Date: 6/3/95		

Depth (feet)	Sample					Field Analysis		LOG		Lithologic Description	Remarks
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B*	PID (ppm) S/B*	Graphic	USCS or Rock Type		
0	BC1819001	00'-01'	NA	100%	1050	NA	NA		SP	Sand, fine, brown-reddish tint, loose, moist	No Odor
1										1'-5', Drive only	
5	BC18190507	05'-07'	NA	90%	1000	NA	7.5/7.3		SC	sandy clay, med-coarse grained, orange brown, cohesive, moist	No Odor
7										7'-10', Drive only	
10	BC18191012	10'-12'	NA	50%	1015	NA	11.2/9.3		SP	sand, med. grained, brown, well-sorted, loose, moist	No Odor
12										12'-15', Drive only	
15											

Key

\* S/B = Sample reading / background reading;

NA = not analyzed

## Borehole Log

Project Name: <b>110<sup>th</sup> FG, MICH ANG ; BATTLECREEK, MICH</b>										Project Number: <b>948901-08</b>	
Borehole Location: <b>SITE 1: Former Fuel Tank Area</b>								Borehole No: <b>BC1B19</b>		Sheet <b>2</b> of	
Depth (feet)	Sample				Field Analysis		LOG		Checked By: <b>JSB</b>	Date: <b>6/3/95</b>	
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B	Graphic	USCS or Rock Type	Lithologic Description	Remarks
15	BC1B191517	15'-17'	NA	50%	1030	NA	10.6/11.3		SW	sand, fine-med. grained, Lt. brown, loose, moist	No Odor
17										17'-20', Drive only	
20	BC1B192022	20'-22'	NA	NA	1055	NA	NA		SP	Sand, med. grained, Lt. brown, well-sorted, loose	No Odor
22										TD = 22'	

Key

S/B = Sample reading / Background reading

NA = not analyzed

holelog2.dwg

# Borehole Log

Project Name: 110 <sup>th</sup> FG, MICH ANG; Battle Creek, Mich										Project Number: 948901-08			
Borehole Location: Site X: <sup>3</sup> Fine Training Area Former Fuel Tank										Borehole No. BC3SB1		Sheet 1 of 1	
Drilling Agency: EarthTech										Driller: B. Bell			
Drilling Equipment: Geoprobe										Date Started: 11/05/94		Total Depth (feet): 6	
Drilling Method: Geoprobe										Date Finished: 11/08/94		Depth to Bedrock (feet): NA	
Drilling Fluid: NA										Number of Samples: 2		Depth to Water (feet): NA	
Completion Information: Filled w/ granular bentonite										Borehole Diameter (in): 1 1/16		Elevation and Datum: NA	
										Logged by: A. Fox			
										Checked by: JJB		Date: 4/7/95	

Depth (feet)	Sample					Field Analysis		LOG		Lithologic Description	Remarks
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B	Graphic	USCS or Rock Type		
0	BC3SB1 000/	00-01'	NA	100%	0835	NA	NA		SW	Sand with trace gravel and organics, brown-Lt. brown	No Odor
1										1'-4', Drive only	
4	BC3B10406	04'-06'	NA	NA	1120	NA	1.4/0.4		SW	Sand, minor fines, med-v. coarse, brown, loose, moist	May have slight hydrocarbon odor
6										TD = 6'	

Key

\* S/B = Sample reading / background reading;

NA = not analyzed

# Borehole Log

Project Name: 110 <sup>th</sup> FG, MICH ANG; Battle Creek, Mich										Project Number: 948901-08			
Borehole Location: Site X: <sup>3</sup> Fire Training Area <del>Former Fuel Tank</del> J5B6/1/95 Area										Borehole No. BC3SB2		Sheet 1 of 1	
Drilling Agency: EarthTech										Driller: B. Bell			
Drilling Equipment: Geoprobe										Date Started: 11/05/94		Total Depth (feet): 6	
Drilling Method: Geoprobe										Date Finished: 11/08/94		Depth to Bedrock (feet): NA	
Drilling Fluid: NA										Number of Samples: 2		Depth to Water (feet): NA	
Completion Information: Filled w/ granular bentonite										Borehole Diameter (in): 1 1/16		Elevation and Datum: NA	
										Logged by: A. Fox			
										Checked by: J.S.B.		Date: 6/3/95	

Depth (feet)	Sample			Field Analysis		LOG		Lithologic Description	Remarks		
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B			Graphic	USCS or Rock Type
0	BC3SB2 0001	00'-01'	NA	100%	0850	NA	0/0		SW	Sand, coarse to v. coarse grained with gravel, brown, trace organics	*stained layer 3" below grade
1										1'-4', Drive only	
4	BC3B20406	04'-06'	NA	NA	1135	NA	336/1.1		SW	Coarse - v. coarse sand with gravel, brown - gray brown, loose	Hydrocarbon Odor
6										TD = 6'	

Key

\* S/B = Sample reading / background reading;

NA = not analyzed

# Borehole Log

Project Name: 110 <sup>th</sup> FG, MICH ANG; Battle Creek, Mich						Project Number: 948901-08					
Borehole Location: Site 3 Fire Training Area Site 1: Former fuel tank						Borehole No. BC3 SB3			Sheet 1 of 1		
Drilling Agency: Earth Tech						Driller: B. Bell					
Drilling Equipment: Geoprobe						Date Started: 11/05/94			Total Depth (feet): 6		
Drilling Method: Geoprobe						Date Finished: 11/08/94			Depth to Bedrock (feet): NA		
Drilling Fluid: NA						Number of Samples: 2			Depth to Water (feet): NA		
Completion Information: Filled w/ granular bentonite						Borehole Diameter (in): 1 1/16			Elevation and Datum: NA		
						Logged by: A. Fox					
						Checked by:			Date:		

Depth (feet)	Sample					Field Analysis		LOG		Lithologic Description	Remarks
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B	Graphic	USCS or Rock Type		
0	BC3SB3	00-01'	NA	100%	0915	NA	0%		SW	Sand, med grained, minor gravel, brown-dk. brown, organic rich	
1										1'-4', Drive only	
4	BC3SB30406	04'-06'	NA	NA	1150	NA	1.4/0.1		SW	Sand, coarse - v. coarse with gravel, loose, moist	slight hydrocarbon odor
6										TD = 6'	

Key

\* S/B = Sample reading / background reading;

NA = not analyzed

**APPENDIX E: QA/QC EVALUATION SUMMARIES**



## APPENDIX E: DATA QUALITY ASSESSMENT

### E.1 Introduction

A standardized Quality Assurance/Quality Control (QA/QC) program was followed during the Remedial Investigation (RI) at the 110th Fighter Wing, Michigan Air National Guard (ANG), Battle Creek, Michigan to ensure that analytical results accurately represent the environmental conditions at the sites. The RI was conducted using the Hazardous Waste Remedial Action Program (HAZWRAP) Level C (i.e., United States Environmental Protection Agency (EPA) Level III) QC requirements described in Requirements For Quality Control Of Analytical Data (DOE/HWP-65/R1, July 1990) and the guidelines and specifications described in the RI Work Plan.

A total of 72 environmental and 31 QC samples were collected during the RI. All water samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and metals. All soil samples were analyzed for metals, but not for VOCs and SVOCs. The number of environmental and field QC samples (i.e., trip blanks, field blanks, equipment rinseates, and field replicates) submitted for analysis are summarized in Table E-1.

**Table E-1 Summary of Analytical Program  
110th FW, MIANG, Battle Creek, Michigan**

Sample Type	VOC <sup>1</sup>	SVOC CLP 3/90 <sup>2</sup>	Metals CLP 3/90	Water Quality Parameters <sup>3</sup>
<b>Confirmation Analyses</b>				
Soil	36	40	46	
Water	26	26	26	14
Total	62	66	72	14
<b>QA/QC Analyses</b>				
Soil Duplicates	4	4	5	
Water Duplicates	4	4	4	2
Equipment Rinseates	9	9	9	9
Field Blanks	6	6	6	6
Trip Blanks	7			

<sup>1</sup>Soils analyzed using SW-846 Method 8240; waters were analyzed using SW-846 Method 8010/8020.

<sup>2</sup>One water sample delivery group analyzed by CLP 10/92.

<sup>3</sup>Nitrate, chloride, sulfate, and total dissolved solids (EPA 600/4-79-020, March 1983).

## **E.2 Data Quality Objectives**

Data Quality Objectives (DQOs) are qualitative and quantitative statements developed by data users to specify the quality of data obtained from field and laboratory data collection activities to support specific decisions or regulatory actions. DQOs also establish numeric limits for the data to allow the data user to determine if the data collected are of sufficient quality for use in their intended application. The data collected during the RI field effort will be used to develop a risk evaluation and recommendations for (1) developing and implementing immediate response plans if required, (2) taking no further action and preparing a Decision Document, (3) initiating focused feasibility studies and remedial measures, or (4) proceeding with feasibility studies. DQOs were established for precision, accuracy, representativeness, comparability, and completeness (PARCCs). The following sections summarize the DQOs established for the PARCCs parameters and the levels of agreement obtained during the RI.

### **E.2.1 Precision**

Precision measures the reproducibility of measurements under a given set of conditions. Precision is expressed quantitatively as the measure of the variability of a group of measurements compared to their average value. The closer the measured values are to each other, the more precise the measurements. For this project, precision was defined as the reproducibility, or degree of agreement, among replicate measurements of the same quantity. Precision was expressed as the percent difference between results of duplicate samples for a given analyte. The Relative Percent Difference (RPD) was calculated as:

$$RPD = \frac{Abs(C_1 - C_2)}{\frac{C_1 + C_2}{2}} \times 100$$

Where;       $C_1$  = Concentration of analyte detected in the sample  
               $C_2$  = Concentration of the analyte detected in the duplicate

The RPD was then compared to established limits to determine the level of precision achieved. For this project overall precision was comprised of analytical and sampling precision. The objectives for analytical precision, sampling precision, and overall precision were to have 90% of the values calculated within the specified RPD range.

**TABLE E-2 LABORATORY QUALITY CONTROL SUMMARY**  
**SOIL MS/MSD VOLATILE ORGANIC COMPOUNDS**  
 110th Fighter Wing, Michigan ANG, Battle Creek, Michigan

	Accuracy					Precision				
	MS Total No. Analyses	Percent Recovery Ranges	Percent Recovery Limits	Number Within Limits	Number Outside Limits	MSD Total No. Analyses	RPD Ranges	RPD Limits	Number Within Limits	Number Outside Limits
<b>VOC</b>										
Chlorobenzene	10	88-110	60-133	10	0	5	0-10	21	5	0
1,1-Dichloroethene	10	82-115	59-172	10	0	5	3-11	22	5	0
Trichloroethene	10	82-112	62-137	10	0	5	0-26	24	4	1
Benzene	10	81-116	66-142	10	0	5	0-4	21	5	0
Toluene	10	91-111	59-139	10	0	5	0-14	21	5	0

Analytical precision refers to the ability of the laboratory to reproduce measurements of a sample concentration. Analytical precision was assessed through the use of analytical replicate samples. Analytical precision, for VOC and SVOC, was determined using Matrix Spike/Matrix Spike Duplicates (MS/MSDs). The laboratory selected one sample in 20 and split the sample into two aliquots, to be used for MS/MSDs analysis. The first aliquot was analyzed for parameters of interest. The remaining aliquot was spiked with known quantities of the parameters of interest and analyzed twice. Analytical precision for metals analyses was determined using duplicate analyses of samples collected during the RI. Duplicate samples for metals analyses were prepared by subdividing one sample in 20 and analyzing both samples of the duplicate pair. The RPDs calculated were used as an indication of analytical precision for the analyses performed.

None of the 25 soil and two of the 184 water RPD values calculated from the VOC analyses exceeded control limits for analytical precision. Control limits for VOC MS/MSDs are detailed in Table E-2 and Table E-3. Two of 44 soil and none of the 37 water RPD values calculated for the SVOC analyses exceeded control limits for analytical precision. Control limits for SVOC MS/MSDs are detailed in Tables E-4, E-5 and E-5a. Seven of the 41 soil and nine of the 69 water RPD values calculated from the metals analyses were outside advisory control limits of  $\pm 20\%$ . Control limits for metals MS/MSDs are detailed in Tables E-6 and E-7. A total of 380 of the 400 RPD values calculated met QC criteria, this represents 95% precision. Based on 95% of the RPDs calculated meeting control limits and the acceptable laboratory QC, the DQO for analytical precision has been met.

Sampling precision refers to the ability of the sampling procedure to reproduce the conditions at the site. Sampling precision was assessed through the collection of field duplicates. Duplicate samples were collected at a rate of one in ten and submitted with the environmental samples for VOCs, SVOCs, and metals analyses. RPD values were calculated for all compounds and elements not qualified "B" or "R" during the data validation process. The RPDs were then used to measure the sampling precision. Four surface soil, one subsurface soil, and four groundwater duplicates were collected during the RI field effort. The duplicate samples were collected using the same procedures used to collect the environmental samples.

**TABLE E-3 LABORATORY QUALITY CONTROL SUMMARY**  
**WATER MS/MSD VOLATILE ORGANIC COMPOUNDS**  
 110th Fighter Wing, Michigan ANG, Battle Creek, Michigan

	Accuracy					Precision				
	MS Total No. Analyses	Percent Recovery Ranges	Percent Recovery Limits	Number Within Limits	Number Outside Limits	MSD Total No. Analyses	RPD Range	RPD Limits	Number Within Limits	Number Outside Limits
8010										
Dibromomethane	8	76-101	42-172	8	0	4	4-20	20	4	0
1,2-Dichlorobenzene	8	79-106	1-208	8	0	4	4-10	20	4	0
1,3-Dichlorobenzene	8	80-104	7-187	8	0	4	1-11	20	4	0
1,4-Dichlorobenzene	8	80-106	42-143	8	0	4	5-11	20	4	0
1,1-Dichloroethane	8	75-104	47-132	8	0	4	2-19	20	4	0
1,2-Dichloroethane	8	71-106	51-147	8	0	4	3-0	20	4	0
1,1-Dichloroethene	8	83-109	28-167	8	0	4	1-11	20	4	0
trans-1,2-Dichloroethene	8	76-102	38-155	8	0	4	0-20	20	4	0
1,2-Dichloropropane	8	80-104	44-156	8	0	4	1-6	20	4	0
cis-1,3-Dichloropropene	8	73-106	22-178	8	0	4	5-10	20	4	0
trans-1,3-Dichloropropene	8	72-108	22-178	8	0	4	5-8	20	4	0
Methylene Chloride	8	78-114	25-162	8	0	4	1-6	20	4	0
1,1,2,2-Tetrachloroethane	8	74-109	8-184	8	0	4	1-16	20	4	0
1,1,1,2-Tetrachloroethane	8	81-104	38-150	8	0	4	4-9	20	4	0

**TABLE E-3 LABORATORY QUALITY CONTROL SUMMARY**  
**WATER MS/MSD VOLATILE ORGANIC COMPOUNDS**  
 110th Fighter Wing, Michigan ANG, Battle Creek, Michigan

Precision											
Accuracy											
		MS Total No. Analyses	Percent Recovery Ranges	Percent Recovery Limits	Number Within Limits	Number Outside Limits	MSD Total No. Analyses	RPD Range	RPD Limits	Number Within Limits	Number Outside Limits
8010											
Bromodichloromethane		8	66-105	42-172	8	0	4	1-19	20	4	0
Bromobenzene		8	70-104	8-184	8	0	4	0-18	20	4	0
Bromoform		8	42-111	13-159	8	0	4	9-56	20	3	1
Bromomethane		8	75-100	1-144	8	0	4	0-8	20	4	0
Bromochloromethane		8	79-101	49-133	8	0	4	2-8	20	4	0
Carbon tetrachloride		8	75-105	43-143	8	0	4	3-15	20	4	0
Chloroethane		8	75-113	46-137	8	0	4	0-12	20	4	0
Chloroform		8	73-107	49-133	8	0	4	0-19	20	4	0
Cholorbenzene		8	80-105	38-150	8	0	4	0-20	20	4	0
Chloromethane		8	75-100	1-193	8	0	4	0-8	20	4	0
2-Chlorotoluene		8	79-105	8-184	8	0	4	4-10	20	4	0
4-Chlorotoluene		8	75-106	8-184	8	0	4	6-8	20	4	0
1,2-Dibromoethane		8	74-97	24-191	8	0	4	0-6	20	4	0
Dibromochloromethane		8	55-101	24-191	8	0	4	7-31	20	3	1

**TABLE E-3 LABORATORY QUALITY CONTROL SUMMARY**  
**WATER MS/MSD VOLATILE ORGANIC COMPOUNDS**  
 110th Fighter Wing, Michigan ANG, Battle Creek, Michigan

Precision											
Accuracy											

**TABLE E-3 LABORATORY QUALITY CONTROL SUMMARY**  
**WATER MS/MSD VOLATILE ORGANIC COMPOUNDS**  
 110th Fighter Wing, Michigan ANG, Battle Creek, Michigan

	Accuracy					Precision				
	MS Total No. Analyses	Percent Recovery Ranges	Percent Recovery Limits	Number Within Limits	Number Outside Limits	MSD Total No. Analyses	RPD Range	RPD Limits	Number Within Limits	Number Outside Limits
8010										
Tetrachloroethene	8	79-102	26-162	8	0	4	0-14	20	4	0
1,1,1-Trichloroethane	8	77-113	41-138	8	0	4	0-16	20	4	0
1,1,2-Trichloroethane	8	75-108	39-136	8	0	4	0-9	20	4	0
Trichloroethene	8	79-102	35-146	8	0	4	0-9	20	4	0
1,2,3,-Trichloropropane	8	70-113	8-184	8	0	4	7-19	20	4	0
Vi nyl Chloride	8	81-100	26-163	8	0	4	0-8	20	4	0
8020										
Benzene	8	90-100	39-150	8	0	4	4-7	20	4	0
Ethyl benzene	8	86-108	32-160	8	0	4	1-8	20	4	0
Chlorobenzene	8	86-111	55-135	8	0	4	2-9	20	4	0
Methyl-tert-butyl-ether	8	80-100	39-150	8	0	4	4-17	20	4	0
Styrene	8	85-116	32-160	8	0	4	2-12	20	4	0
Toluene	8	88-103	46-148	8	0	4	2-15	20	4	0
1,4-Dimethylbenzene	8	81-103	32-160	8	0	4	2-10	20	4	0
1,3-Dimethylbenzene	8	85-109	32-160	8	0	4	3-10	20	4	0



**TABLE E-5 LABORATORY QUALITY CONTROL SUMMARY:  
WATER MS/MSD SEMIVOLATILE ORGANIC COMPOUNDS  
110th Fighter Wing, Michigan ANG, Battle Creek, Michigan**

	Accuracy				Precision					
	MS Total No. Analyses	Percent Recovery Ranges	Percent Recovery Limits	Number Within Limits	Number Outside Limits	MSD Total No. Analyses	RPD Range	RPD Limits	Number Within Limits	Number Outside Limits
Phenol	4	27-36	12-89	4	0	2	0-12	42	2	0
2-Chlorophenol	4	46-70	27-123	4	0	2	-8-6	40	2	0
1,4-Dichlorobenzene	4	54-72	36-97	4	0	2	-7-7	28	2	0
n-Nitroso-di-n-propylamine	4	76-85	41-116	4	0	2	-4-1	38	2	0
1,2,4-Trichlorobenzene	4	67-84	39-98	4	0	2	-1-14	28	2	0
4-Chloro-3-methylphenol	4	56-86	23-97	4	0	2	-2-7	42	2	0
Ancenapthene	4	58-83	46-118	4	0	2	5-6	31	2	0
4-Nitrophenol	4	27-38	10-80	4	0	2	0-14	50	2	0
2,4-Dinitrotoluene	4	61-72	24-96	4	0	2	2-4	38	2	0
Pentachlorophenol	4	50-76	9-103	4	0	2	-11-3	50	2	0
Pyrene	4	63-92	26-127	4	0	2	0-7	31	2	0

**TABLE E-4 LABORATORY QUALITY CONTROL SUMMARY:  
SOIL MS/MSD SEMIVOLATILE ORGANIC COMPOUNDS  
110th Fighter Wing, Michigan ANG, Battle Creek, Michigan**

	Accuracy					Precision				
	MS Total No. Analyses	Percent Recovery Ranges	Percent Recovery Limits	Number Within Limits	Number Outside Limits	MSD Total No. Analyses	RPD Range	RPD Limits	Number Within Limits	Number Outside Limits
Phenol	8	70-113	12-110	4	4	4	3-25	42	4	0
2-Chlorophenol	8	68-113	27-123	7	1	4	4-22	40	4	0
1,4-Dichlorobenzene	8	57-110	36-97	7	1	4	9-30	28	3	1
n-Nitroso-di-n-propylamine	8	64-111	41-116	8	0	4	8-38	38	4	0
1,2,4-Trichlorobenzene	8	65-129	39-98	6	2	4	6-23	28	4	0
4-Chloro-3-methylphenol	8	72-130	23-97	6	2	4	1-23	42	4	0
Ancenaphthene	8	62-109	46-118	6	2	4	2-24	31	3	1
4-Nitrophenol	8	46-121	10-80	5	3	4	0-23	50	4	0
2,4-Dinitrotoluene	8	53-122	24-96	4	4	4	0-20	38	4	0
Pentachlorophenol	8	46-116	9-103	7	1	4	6-34	50	4	0
Pyrene	8	52-280	26-127	6	2	4	1-9	31	4	0

**TABLE E-6 LABORATORY QUALITY CONTROL SUMMARY:**  
**SOIL SPIKE AND DUPLICATE METALS**

110th Fighter Wing, Michigan ANG, Battle Creek, Michigan

	Accuracy					Precision				
	Spike Total No. Analyses	Percent Recovery Ranges	Percent Recovery Limits	Number Within Limits	Number Outside Limits	Duplicate Total No. Analyses	RPD Range	RPD Limits	Number Within Limits	Number Outside Limits
Antimony	4	29.1-38.9	75-125	0	4	3	0-200	35	2	1
Arsenic	4	70.3-184.2	75-125	2	2	3	29.0-45.3	35	2	1
Barium	3	85.5-89.6	75-125	3	0	2	6.2-8.5	35	2	0
Beryllium	4	79.4-93.0	75-125	4	0	3	3.4-19.3	35	2	0
Cadmium	4	77.8-82.7	75-125	4	0	3	0-200	35	2	1
Chromium	4	76.5-91.0	75-125	4	0	3	9.4-23.6	35	2	0
Copper	4	90.9-102.6	75-125	4	0	3	0-5.1	35	2	1
Lead	7	78.0-248.9	75-125	6	1	4	1.3-112.5	35	3	1
Mercury	4	94.5-103.5	75-125	3	1	2	0	35	2	0
Nickel	4	81.3-85.7	75-125	4	0	3	0.3-14.9	35	2	0
Selenium	4	63.4-72.9	75-125	0	4	3	0-1.3	35	2	0
Silver	4	68.4-88.9	75-125	2	2	3	0	35	2	0
Thallium	4	78.1-90.0	75-125	4	0	3	0-200	35	2	1
Zinc	4	72.5-94.5	75-125	3	1	3	4.3-36.5	35	2	1

**TABLE 5A LABORATORY QUALITY CONTROL SUMMARY:  
WATER MS/MSD SEMIVOLATILE ORGANIC COMPOUNDS  
110th Fighter Wing, Michigan ANG, Battle Creek, Michigan**

	Accuracy					Precision				
	Total No. Analyses	Percent Recovery Ranges	Percent Recovery Limits	Number Within Control Limits	Number Outside Control Limits	MSD Total No. Analyses	Range RPD	RPD Limits	Number Within Limits	Number Outside Limits
Phenol	2	75-80	40-120	2	0	1	6	40	1	0
bis (2-Chloroethyl)ether	2	75-82	50-110	2	0	1	9	40	1	0
2-Chlorophenol	2	78-86	50-110	2	0	1	10	40	1	0
n-Nitroso-di-n-propylamine	2	83-95	30-110	2	0	1	13	40	1	0
Hexachloroethane	2	62-71	20-110	2	0	1	14	40	1	0
Isophorone	2	74-86	50-110	2	0	1	15	40	1	0
1,2,4-Trichlorobenzene	2	72-83	40-100	2	0	1	14	40	1	0
Naphthalene	2	80-87	30-110	2	0	1	8	40	1	0
4-Chloroaniline	2	65-75	10-120	2	0	1	14	40	1	0
2,4,6-Trichlorophenol	2	68-74	40-120	2	0	1	8	40	1	0
2,4-Dinitrotoluene	2	54-59	30-120	2	0	1	9	40	1	0
Diethylphthalate	2	80-88	50-120	2	0	1	10	40	1	0
n-Nitrosodiphenylamine	2	47-52	30-110	2	0	1	10	40	1	0
Hexachlorobenzene	2	79-86	40-120	2	0	1	8	40	1	0
Benzo(a)pyrene	2	14-17	50-120	0	2	1	19	40	1	0

The overall project objective for sampling precision outlined in the Sampling and Analysis Plan was to have 90% of the values calculated for the sampling program within the specified RPD range of  $\pm 20\%$  for water samples, and  $\pm 35\%$  for soil samples.

The results of the RPD calculations show that 47 sample/duplicate pairs failed to meet the RPD criteria. A complete discussion of all replicate samples is presented in Section E.3.4. Based on the RPD values calculated 1062 of the 1109 RPDs calculated, from the sample/duplicate pairs, met the associated RPD criteria. This represents a sampling precision of 96%. As a result, the DQOs for analytical precision has been met.

Based on the results of the laboratory and sampling precision 1442 of the 1509 RPD values met the associated RPD criteria. These results represent an overall precision of 95.6%. As a result the DQOs for overall precision has not been met. The failure of the overall precision to meet the DQOs is due to the lack of agreement in the sample/duplicate pairs. As already discussed, these results had only marginal impact on the data. No corrective action was required based on the RPD values.

### **E.2.2 Accuracy**

Accuracy measures the bias in a measurement system. Accuracy was defined as the degree of difference between measured or calculated values and the true value. The closer the numerical value of the measurement approaches the true value, or actual concentration, the more accurate the measurement. Overall project accuracy consists of both analytical and sampling accuracy.

Analytical accuracy is expressed as the percent recovery of a compound or element that has been added to the environmental sample at a known concentration before analyses. Analytical accuracy was determined using MS/MSD and surrogate recovery data. The following equation was used to calculate percent recovery:

$$\%R = \frac{A_r - A_o}{A_f} \times 100$$

Where:  $A_r$  = Analyte concentration detected in the spiked sample  
 $A_o$  = Analyte concentration detected in the unspiked sample

**TABLE E-7 LABORATORY QUALITY CONTROL SUMMARY:**  
**WATER SPIKE AND DUPLICATE METALS**  
 110th Fighter Wing, Michigan ANG, Battle Creek, Michigan

	Accuracy					Precision				
	Spike Total No. Analyses	Percent Recovery Ranges	Percent Recovery Limits	Number Within Limits	Number Outside Limits	Duplicate Total No. Analyses	RPD Range	RPD Limits	Number Within Limits	Number Outside Limits
Aluminum	5	95.7-109	75-125	5	0	3	0-23.1	20	2	1
Antimony	5	92.6-116	75-125	5	0	3	0	20	3	0
Arsenic	5	104-111	75-125	5	0	3	0-200	20	1	2
Beryllium	5	95.8-112	75-125	5	0	3	0.6-4.7	20	3	0
Cadmium	5	73.2-114	75-125	4	1	3	0	20	3	0
Calcium	0		75-125			3	0.9-5.7	20	3	0
Chromium	5	93.9-117	75-125	5	0	3	0	20	3	0
Cobalt	5	92.5-117	75-125	5	0	3	0	20	3	0
Copper	5	95.7-122	75-125	5	0	3	0-11.2	20	3	0
Iron	5	89.3-129	75-125	4	1	3	1.3-200	20	2	1
Lead	5	72.7-118	75-125	3	2	3	0-200	20	2	1
Magnesium	0		75-125			3	0.6-6.8	20	3	0
Manganese	5	93.0-117	75-125	5	0	3	0.2-5.4	20	3	0
Mercury	5	70.7-100	75-125	3	2	3	0	20	3	0
Nickel	5	96.1-116	75-125	5	0	3	0	20	3	0
Potassium	0		75-125			3	0-200	20	2	1
Selenium	5	77.7-105	75-125	5	0	3	0	20	3	0
Silver	5	86.7-105	75-125	5	0	3	0	20	3	0
Sodium	0		75-125			3	2.1-4.2	20	3	0
Thallium	5	69.1-75	75-125	3	2	3	0	20	3	0
Vanadium	5	95.4-119	75-125	5	0	3	0-200	20	2	1
Zinc	5	92.6-101	75-125	5	0	3	18.2-52	20	1	2

evaluated with respect to the analytical accuracy DQOs. These results are not considered to have any adverse impact on the environmental data quality.

A total of 46 of the 1621 calculated percent recovery values exceeded control limits indicating that on average 97% accuracy was achieved. As a result, the DQOs for analytical accuracy has been met.

Sampling accuracy was maximized by adherence to the strict QA program presented in the RI Quality Assurance Project Plan (QAPP). All procedures (i.e., soil boring installation, soil sample collection procedures, well installation, well development, groundwater sample collection procedures, and health monitoring equipment calibration and operation) used during the RI were documented as standard operating procedures (SOPs). Field QA samples (i.e., trip blanks, field blanks, and equipment rinseates) were prepared such that all samples represented the particular site from which they were collected, and assessed any cross-contamination that may have occurred. The environmental samples associated with the appropriate field QA samples were qualified based on the contaminants detected in the field QA samples. Compounds and elements detected in associated environmental samples with concentrations less than five times (ten times for common laboratory contaminants) the concentration detected in the blank were considered as unreliable and were qualified "B" accordingly.

#### Trip blanks

A total of seven trip blanks were shipped with environmental samples to be analyzed for VOCs. 1,3-Dichlorobenzene, methylene chloride, toluene, trichloroethane, and xylenes were detected in one or more trip blanks. These concentrations could not be attributed to the laboratory environment, and were used to qualify environmental samples for cross-contamination. Trip blanks with detectable concentrations of contaminants are detailed in Section E.3.1

#### Field Blanks

Six field blanks were collected and analyzed with the environmental samples. The field blanks consisted of the American Society for Testing Materials (ASTM) Type II water and the potable

$A_i$  = Analyte concentration added to the sample

Objectives for accuracy were to have 90% of the data within the specified percent recovery levels for that analyte. Analytical accuracy was qualitatively assessed by evaluating the following laboratory QC information: sample holding times, method blank, tuning and mass calibration (gas chromatographer/mass spectrometer (GC/MS) only), internal standard (GC/MS only), laboratory control sample, method blank spike recovery, and initial and continuing calibration results calculated from all analyses conducted on environmental samples. Analytical accuracy was quantitatively assessed by evaluating the percent recoveries of spikes and surrogates.

#### Percent Recoveries

None of the 50 soil and none of the 368 water percent recoveries were outside the control limits for MS/MSD analyses conducted on the samples collected and analyzed for VOCs. Established control limits for VOCs percent recovery values are presented in Tables E-2 and E-3. None of 120 soil and one of the 157 water surrogate percent recoveries were outside the control limits for surrogate analyses. All supporting VOC QC information cited above was also qualitatively evaluated with respect to the analytical accuracy DQOs.

Seventeen of the 88 soil and none of the 74 water percent recovery values calculated were outside the control limits for the MS/MSD analyses conducted on the samples collected and analyzed for SVOCs. Established control limits for SVOC percent recovery values are presented in Table E-4, E-5 and E-5A. Four of the 432 soil and four of the 180 water percent recovery values calculated were outside the control limits for the surrogate analyses conducted on the samples collected and analyzed for SVOCs. All supporting SVOC QC information cited above was also qualitatively evaluated with respect to the analytical accuracy DQOs.

Fourteen of the 57 soil and six of the 95 water metals percent recovery values from the matrix spike analyses conducted on the samples exceeded recovery limits of  $\pm 25\%$ . Established control limits for metals percent recovery values are presented in Table E-6 and E-7. All supporting target analyte metals QC information cited above were also qualitatively



location and time. Representativeness was assessed by reviewing the drilling and sample collection methods used during the RI at the Kellogg ANG. The reproducibility of a representative set of samples reflects the degree of heterogeneity of the sampled medium, as well as the effectiveness of the sampling techniques.

Soil samples were collected and submitted for laboratory analyses from Sites 1 and 3. Surface soil samples collected between 0 to 1 ft and 1 to 2 ft were collected using a stainless steel hand auger equipped with a one foot removable stainless steel liner. All other soil samples were collected from borings. All borings were advanced with a truck-mounted drilling rig using continuous-flight hollow stem augers. Soil samples were collected, from each boring, using a two foot split-spoon sampler equipped with four, six inch removable stainless steel liners. Samples were collected continuously from the surface to ten feet and at five foot centers to the water table for all borings not converted to monitoring wells. Samples were collected continuously from the surface to the water table and at five foot centers to final depth for all borings used as monitoring wells. Split-spoon samples were logged according to the Unified Soils Classification System and field-screened with a photoionization detector meter for total volatiles and with a field GC for benzene, toluene, ethylbenzene, and xylenes concentrations. Blow counts were recorded as a measure of the relative soil density. All borings, not used as monitoring wells, were backfilled with a cement/bentonite slurry to the surface. All borings were marked at the surface and surveyed. A minimum of two soil samples, from each boring, were submitted for laboratory analyses. The sample collected from just below the ground surface and the sample collected from unsaturated soils just above the water table were submitted for laboratory analyses. A third and fourth sample were sometimes submitted based on field GC results and/or lithology. Filtered groundwater samples, for metals analyses, were collected using a disposable polytetrafluoroethylene (PTFE) bailer and a disposable, 0.45  $\mu\text{m}$  filter. Groundwater samples were obtained after development of each well. After well installation, all wells were allowed to recharge, were then purged, and sampled. The volume of water in each well casing was calculated prior to purging and three to four casing volumes were removed. A disposable PTFE bailer was used to remove the stagnant groundwater from each well. During well development the pH, temperature, and conductivity were measured and recorded, in addition the degree of turbidity and odor were described and recorded. The pH, temperature, and conductivity of the groundwater were measured and recorded before, during, and after purging, and prior to

water source used for the decontamination of equipment. Low levels of aluminum, barium, bromochloromethane, bromodichloromethane, bromoform, 2-chlorotoluene, 4-chlorotoluene, calcium, chloride, chloroform, chromium, copper, dibromochloromethane, iron, lead, magnesium, manganese, potassium, selenium, sodium, sulfate, tetrachloroethane, toluene, 1,1,1-trichloroethane, trichloroethene, xylene, and zinc were detected in selected field blanks collected during the RI. These concentrations could not be attributed to the laboratory environment, and were used to qualify environmental samples for cross-contamination. Detected compounds for the field blanks are detailed in Section E.3.2.

### **Equipment Rinseates**

Nine equipment rinseates were collected by pouring ASTM Type II water over or through decontaminated sampling equipment. The equipment rinseates were analyzed with the environmental samples to document the effectiveness of the decontamination efforts. Aluminum, barium, benzene, calcium, chloride, chloroform, 2-chlorotoluene, 4-chlorotoluene, chromium, copper, 1,2-dichlorobenzene, lead, sodium, styrene, sulfate, tetrachloroethane, toluene, 1,1,1-trichloroethane, xylenes, and zinc were detected in the associated equipment rinseates. These concentrations could not be attributed to the laboratory environment, and were used to qualify the environmental samples for cross-contamination. The majority of the compounds and elements detected in the equipment rinseates were below the quantitation limit. All compounds and elements detected in the equipment rinseates are detailed in Section E.3.3.

Based on an evaluation of the compounds detected in the field QC samples overall field accuracy was deemed acceptable, except where noted. A complete discussion of field QC results is presented in Section E.3.

### **E.2.3 Representativeness**

Representativeness expresses the degree to which the data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. Sample representativeness was ensured, during the RI, by collecting sufficient samples of a population medium, properly distributed with respect to

remedial recommendations due to increased risk of indicating false positives or omitting compounds or elements that are present. Project completeness was defined as the percentage of data points used to prepare the risk characterization and recommendations for site remediation. The objective for project completeness was set at 90%.

Based on the evaluation of the laboratory QC results for the 7950 data points presented in Appendix E, these data were considered equal to 95.5% complete, and as such, were used as the basis of all recommendations presented in this report. A total of 357 data points were rejected for use because the data was qualified "R" indicating unreliable results or "B" indicating possible contamination from an outside source.

### **E.3 Field Quality Control Assessment**

Field QC samples were collected, in an effort to assess field QC. These samples included trip blanks, field blanks, equipment rinseates, and field duplicate samples. The number of field QC samples collected were in accordance with HAZWRAP guidance as presented in DOE/HWP-69/R1. All field QC samples were collected and analyzed by the same SOPs and methods used for the 81 environmental samples. Table E-8 provides a cross-reference of the samples and their associated QC samples.

#### **E.3.1 Trip Blanks**

Trip blanks were used to check for cross-contamination during sample handling and shipping of samples to be analyzed for VOCs. A trip blank was shipped with each cooler containing samples to be analyzed for VOCs. All trip blanks were supplied by Compuchem Environmental Corporation in North Carolina. Compuchem prepared trip blanks using ASTM Type II water. The trip blanks were stored with unused sample bottles prior to being packed and shipped with the samples. A total of seven trip blanks were shipped with samples and analyzed for VOCs. Table E-9 summarizes the concentrations of the VOCs detected in the trip blanks used during the RI field effort. Methylene chloride, 1,3-dichlorobenzene, toluene, xylene, and trichloroethene were detected in trip blanks collected during the RI at the base. The contamination detected in the trip blanks can be attributed to several possible causes.

sampling. These data were collected to ensure a representative groundwater sample was collected.

Based on the evaluation of the factors described above and summarized in Section E.3 the samples collected during the RI are considered to be representative of the environmental conditions at the base.

#### **E.2.4 Comparability**

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared to another and is limited to the other PARCCs parameters, because only when precision and accuracy are known can data sets be compared. To optimize comparability, only the specific methods and protocols specified in the RI QAPP were used to collect and analyze samples during the RI. By using consistent sampling and analysis procedures, all data sets are comparable within the two sites at the base, between the two sites, or among ANG facilities nationwide. This consistency ensures that remedial action decisions and priorities are based on a consistent data base.

All samples collected for VOC analyses were analyzed using SW-846 methods. Soils were analyzed using SW-846 Method 8240, water samples were analyzed using SW-846 Method 8010/8020. All samples collected for SVOC analyses were analyzed using CLP Method 3/90, with the exception of one water sample delivery group analyzed using CLP Method 10/92. All samples collected for metals analyses were analyzed using CLP method 3/90. All samples collected for the analysis of chloride, nitrate, dissolved solids, and sulfate were analyzed using EPA 600/4-79-020, March 1983. Based on the precision and accuracy assessment presented above, the data collected during the RI are considered to be comparable with the data collected during previous investigations.

#### **E.2.5 Completeness**

Completeness was defined as the percentage of useable data obtained from a measurement system. Useable data are those data not rejected during the data validation process. Values and concentrations qualified "R" or "B" are excluded from use in the risk characterization and

**TABLE E-8 QC CROSS REFERENCE**  
110th Fighter Wing, Michigan ANG, Battle Creek, Michigan

Sample ID	Sample Date	Associated QC Samples		
BC-BG-SS01	12/17/94	BC-TB3	BC-FB1, BC-FB2	BC-ER2
BC-BG-SS02	12/17/94	BC-TB3	BC-FB1, BC-FB2	BC-ER2
BC-BG-SS03	12/17/94	BC-TB3	BC-FB1, BC-FB2	BC-ER2
BC-BG-SS03D	12/17/94	BC-TB3	BC-FB1, BC-FB2	BC-ER2
BC-BG-SS04	12/17/94	BC-TB3	BC-FB1, BC-FB2	BC-ER2
BC-BG1-05-07	12/17/94	BC-TB3	BC-FB1, BC-FB2	BC-ER2
BC-BG2-05-07	12/17/94	BC-TB3	BC-FB1, BC-FB2	BC-ER2
BC-BG3-05-07	12/17/94	BC-TB3	BC-FB1, BC-FB2	BC-ER2
BC-BG4-05-07	12/17/94	BC-TB3	BC-FB1, BC-FB2	BC-ER2
BC-MW1-GW4	05/19/94	BC-TB1	BC-FB1, BC-FB2, BC-FB3	BC-ER1
BC-MW2-GW4	05/19/94	BC-TB1	BC-FB1, BC-FB2, BC-FB3	BC-ER1
BC-MW3-GW4	05/20/94			BC-ER1
BC-MW4-GW4	05/23/94	BC-TB5	BC-FB1, BC-FB2, BC-FB3	BC-ER3
BC-MW4-GW5	12/17/94	BC-TB2	BC-FB1	
BC-MW5-GW4	05/23/94	BC-TB5	BC-FB1, BC-FB2, BC-FB3	BC-ER1
BC-MW6-GW4	05/22/94	BC-TB5	BC-FB1, BC-FB2, BC-FB3	BC-ER1
BC-MW7-GW4	05/24/94	BC-TB6	BC-FB1, BC-FB2, BC-FB3	BC-ER3
BC-MW8-GW4	05/24/94	BC-TB6	BC-FB1, BC-FB2, BC-FB3	BC-ER3
BC-MW9-GW4	05/23/94	BC-TB5	BC-FB1, BC-FB2, BC-FB3	BC-ER3
BC-MW9-GW4D	05/23/94	BC-TB5	BC-FB1, BC-FB2, BC-FB3	BC-ER3
BC-MW11-GW4	05/23/94	BC-TB4	BC-FB1, BC-FB2, BC-FB3	BC-ER1
BC-MW12-GW4	05/23/94	BC-TB4	BC-FB1, BC-FB2, BC-FB3	BC-ER1
BC-MW13-GW4	05/20/94			BC-ER1
BC-MW13-GW4D	05/20/94			BC-ER1
BC-MW14-GW4	05/22/94	BC-TB5	BC-FB1, BC-FB2, BC-FB3	BC-ER1
BC-MW15-GW4	05/24/94	BC-TB6	BC-FB1, BC-FB2, BC-FB3	BC-ER3
BC-MW16-GW5	12/18/94	BC-TB2	BC-FB1	
BC1-B1-00-01	11/07/94	BC-TB2	BC-FB3, BC-FB6	BC-ER5
BC1-B1-00-01D	11/07/94	BC-TB2	BC-FB3, BC-FB6	BC-ER5
BC1-B1-05-07	11/07/94	BC-TB2	BC-FB3, BC-FB6	BC-ER4
BC1-B1-20-22	11/06/94	BC-TB1	BC-FB3, BC-FB6	BC-ER5
BC1-B2-00-01	11/07/94	BC-TB2	BC-FB3, BC-FB6	BC-ER5
BC1-B2-10-12	11/07/94	BC-TB2	BC-FB3, BC-FB6	BC-ER5
BC1-B2-20-22	11/06/94	BC-TB1	BC-FB3, BC-FB6	BC-ER5
BC1-B3-00-01	11/07/94	BC-TB1	BC-FB3, BC-FB6	BC-ER5
BC1-B3-20-22	11/08/94	BC-TB3	BC-FB3, BC-FB6	BC-ER6
BC1-B4-00-01	11/09/94	BC-TB4	BC-FB3, BC-FB6	BC-ER6
BC1-B4-10-12	11/06/94	BC-TB1	BC-FB3, BC-FB6	BC-ER5
BC1-B5-00-01	11/09/94	BC-TB4	BC-FB3, BC-FB6	BC-ER6
BC1-B5-00-01D	11/09/94	BC-TB4	BC-FB3, BC-FB6	BC-ER6
BC1-B5-10-12	11/07/94	BC-TB3	BC-FB3, BC-FB6	BC-ER5
BC1-B5-20-22	11/07/94	BC-TB2	BC-FB3, BC-FB6	BC-ER5
BC1-B7-00-01	11/09/94	BC-TB4	BC-FB3, BC-FB6	BC-ER7
BC1-B7-10-12	11/09/94	BC-TB4	BC-FB3, BC-FB6	BC-ER7
BC1-B8-00-01	11/09/94	BC-TB4	BC-FB3, BC-FB6	BC-ER6
BC1-B8-20-22	11/07/94	BC-TB2	BC-FB3, BC-FB6	BC-ER5
BC1-B9-00-01	11/09/94	BC-TB4	BC-FB3, BC-FB6	BC-ER6
BC1-B11-00-01	11/10/94	BC-TB4	BC-FB3, BC-FB6	BC-ER6
BC1-B11-19-23	11/09/94	BC-TB4	BC-FB3, BC-FB6	BC-ER6
BC1-B11-19-23D	11/09/94	BC-TB4	BC-FB3, BC-FB6	BC-ER6
BC1-B12-00-01	11/09/94	BC-TB4	BC-FB3, BC-FB6	BC-ER6
BC1-B12-20-22	11/07/94	BC-TB2	BC-FB3, BC-FB6	BC-ER5
BC1-B15-10-12	11/08/94	BC-TB3	BC-FB3, BC-FB6	BC-ER6

**TABLE E-8 QC CROSS REFERENCE**  
110th Fighter Wing, Michigan ANG, Battle Creek, Michigan

Sample ID	Sample Date	Associated QC Samples		
BC1-B18-15-17	11/09/94	BC-TB4	BC-FB3, BC-FB6	BC-ER7
BC1-B19-00-01	11/10/94	BC-TB4	BC-FB3, BC-FB6	BC-ER7
BC1-B19-20-22	11/09/94	BC-TB4	BC-FB3, BC-FB6	BC-ER7
BC1-MW1-GW5	12/18/94	BC-TB2	BC-FB1	
BC1-MW1-GW5D	12/18/94	BC-TB2	BC-FB1	
BC1-MW2-10-12	12/14/94	BC-TB1	BC-FB3, BC-FB6	
BC1-MW2-20-22	12/14/94	BC-TB1	BC-FB3, BC-FB6	
BC1-MW3-GW5	12/18/94	BC-TB5	BC-FB1	
BC1-SS11	12/18/94	BC-TB3	BC-FB3, BC-FB6	
BC1-SS12	12/18/94	BC-TB3	BC-FB3, BC-FB6	
BC1-SS13	12/18/94	BC-TB3	BC-FB3, BC-FB6	
BC1-SS14	12/18/94	BC-TB3	BC-FB3, BC-FB6	
BC2-MW1-GW4	05/23/94	BC-TB5	BC-FB1, BC-FB2, BC-FB3	BC-ER1
BC2-MW1-GW5	12/17/94	BC-TB2	BC-FB1	
BC3-B1-04-06	11/08/94	BC-TB1	BC-FB3, BC-FB6	BC-ER3
BC3-B2-04-06	11/08/94	BC-TB1	BC-FB3, BC-FB6	BC-ER3
BC3-B3-04-06	11/08/94	BC-TB1	BC-FB3, BC-FB6	BC-ER3
BC3-MW1-GW4	05/23/94	BC-TB4	BC-FB1, BC-FB2	BC-ER2
BC3-MW1-GW4D	05/23/94	BC-TB4	BC-FB1, BC-FB2	BC-ER2
BC3-MW2-GW4	05/23/94	BC-TB5	BC-FB1, BC-FB2	BC-ER2
BC3-MW3-GW4	05/23/94	BC-TB4	BC-FB1, BC-FB2	BC-ER2
BC3-MW4-GW4	05/23/94	BC-TB4	BC-FB1, BC-FB2	BC-ER2
BC3-MW5-GW4	05/23/94	BC-TB4	BC-FB1, BC-FB2	BC-ER2
BC3-MW6-GW4	05/23/94	BC-TB4	BC-FB1, BC-FB2	BC-ER2
BC3-SB101	11/05/94	BC-TB1	BC-FB3, BC-FB6	BC-ER3
BC3-SB201	11/05/94	BC-TB1	BC-FB3, BC-FB6	BC-ER3
BC3-SB201	11/05/94	BC-TB1	BC-FB3, BC-FB6	BC-ER3
BC3-SB301	11/05/94	BC-TB1	BC-FB3, BC-FB6	BC-ER3

**TABLE E-9 ANALYTES DETECTED IN TRIP BLANKS**  
110th Fighter Wing, Michigan ANG, Battle Creek, Michigan

Sample ID	Analyte	Result	Qualifier	Units
BC-TB01	Toluene	0.16	()	µg/l
BC-TB01	o-Xylene	0.18	()	µg/l
BC-TB01	1,3-Dichlorobenzene	0.19	()	µg/l
BC-TB02	Toluene	0.27		µg/l
BC-TB03	Toluene	0.27		µg/l
BC-TB04	Toluene	0.32		µg/l
BC-TB4	Methylene chloride	0.62		µg/l
BC-TB5	p-Xylene	0.04		µg/l
BC-TB6	Trichloroethene	0.10		µg/l
BC-TB6	Toluene	0.16		µg/l
BC-TB6	m-Xylene	0.05		µg/l

Methylene chloride is a common laboratory contaminant and is frequently detected. The other contamination could be attributed to contamination from samples stored with the trip blanks at the laboratory.

### **E.3.2 Field Blanks**

Field blanks were collected to provide baseline analytical data for the water used for equipment decontamination. A total of six field blanks were collected, including blanks for the ASTM Type II water and the potable water used as decontamination water. Field blanks were collected by randomly selecting sample containers, filling them with water from the sample source, and then preserving as appropriate for the required analyses. The blanks were analyzed in the same manner as the associated environmental samples. Low levels of aluminum, barium, bromochloromethane, bromodichloromethane, bromoform, 2-chlorotoluene, 4-chlorotoluene, calcium, chloride, chloroform, chromium, copper, dibromochloromethane, iron, lead, magnesium, manganese, potassium, selenium, sodium, sulfate, tetrachloroethane, toluene, 1,1,1-trichloroethane, trichloroethane, xylene, and zinc were detected in selected field blanks prepared during the RI. Table E-10 summarizes the concentrations of elements detected in the field blanks collected at the base. The Michigan ANG RI was conducted in three separate sampling events, field blanks were obtained for each sampling event. The low levels of compounds and elements detected in the field blanks are not considered to have contributed to any levels seen in the associated environmental samples.

### **E.3.3 Equipment Rinseates**

Equipment rinseates were collected to check for cross-contamination introduced from sample to sample through the sampling equipment. All equipment rinseates were prepared by pouring ASTM Type II water through or over decontaminated sampling equipment. The equipment rinseates were preserved as appropriate for the required analyses and analyzed using the same methods as the associated environmental samples. Nine equipment rinseates were prepared from the equipment used to obtain environmental samples. Table E-11 summarizes the concentrations of elements detected in the equipment blanks collected at the base. Aluminum, barium, benzene, calcium, chloride, chloroform, 2-chlorotoluene, 4-chlorotoluene, chromium, copper, 1,2-dichlorobenzene, lead, sodium, styrene, sulfate, tetrachloroethane,



**TABLE E-10 ANALYTES DETECTED IN FIELD BLANKS**  
110th Fighter Wing, Michigan ANG, Battle Creek, Michigan

Sample ID	Analyte	Result	Qualifier	Units
BC-FB01	Chloroform	2.70		µg/l
BC-FB01	Bromochloromethane	0.71		µg/l
BC-FB01	Toluene	0.17	()	µg/l
BC-FB01	Aluminum	123.00	()	µg/l
BC-FB01	Barium	1.60	()	µg/l
BC-FB01	Calcium	61.30	()	µg/l
BC-FB01	Copper	2.10	()	µg/l
BC-FB01	Iron	50.20	()	µg/l
BC-FB01	Lead	1.70	()	µg/l
BC-FB01	Magnesium	5.90	()	µg/l
BC-FB01	Manganese	0.42	()	µg/l
BC-FB01	Potassium	128.00	()	µg/l
BC-FB01	Sodium	1130.00	()	µg/l
BC-FB01	Zinc	0.70	()	µg/l
BC-FB1	Chloroform	0.23		µg/l
BC-FB1	1,1,1-Trichloroethane	0.09		µg/l
BC-FB1	Trichloroethene	0.03		µg/l
BC-FB1	Tetrachloroethene	0.07		µg/l
BC-FB1	2-Chlorotoluene	3.90		µg/l
BC-FB1	4-Chlorotoluene	0.46		µg/l
BC-FB1	Benzene	0.04		µg/l
BC-FB1	Toluene	4.60		µg/l
BC-FB1	p-Xylene	0.20		µg/l
BC-FB1	m-Xylene	0.63		µg/l
BC-FB1	o-Xylene	0.53		µg/l
BC-FB1	Styrene	0.43		µg/l
BC-FB1	Chloride	0.00		mg/l
BC-FB1	Sulfate	2.19		mg/l
BC-FB02	Chloroform	15.00		µg/l
BC-FB02	Dibromochloromethane	0.04	()	µg/l
BC-FB02	Aluminum	197.00	()	µg/l
BC-FB02	Barium	26.30	()	µg/l
BC-FB02	Calcium	37100.00		µg/l
BC-FB02	Copper	118.00		µg/l
BC-FB02	Iron	65.00	()	µg/l
BC-FB02	Lead	3.50		µg/l
BC-FB02	Magnesium	10200.00		µg/l
BC-FB02	Manganese	0.96	()	µg/l
BC-FB02	Potassium	1970.00	()	µg/l
BC-FB02	Sodium	6940.00		µg/l
BC-FB02	Zinc	9.40	()	µg/l
BC-FB2	Chloroform	2.20		µg/l
BC-FB2	Bromochloromethane	0.17		µg/l
BC-FB2	Bromodichloromethane	4.90		µg/l
BC-FB2	Dibromochloromethane	6.90		µg/l
BC-FB2	Bromoform	2.10	J	µg/l
BC-FB2	Toluene	0.18		µg/l
BC-FB2	Barium	136.00	()	µg/l
BC-FB2	Calcium	81200.00		µg/l
BC-FB2	Copper	44.50		µg/l
BC-FB2	Iron	819.00		µg/l
BC-FB2	Magnesium	21900.00		µg/l

**TABLE E-10 ANALYTES DETECTED IN FIELD BLANKS**  
110th Fighter Wing, Michigan ANG, Battle Creek, Michigan

BC-FB2	Manganese	51.20		$\mu\text{g}/\ell$
BC-FB2	Potassium	1030.00	()	$\mu\text{g}/\ell$
BC-FB2	Sodium	10400.00		$\mu\text{g}/\ell$
BC-FB2	Chloride	30.20		$\text{mg}/\ell$
BC-FB2	Sulfate	38.90		$\text{mg}/\ell$
BC-FB03	Barium	0.58	()	$\mu\text{g}/\ell$
BC-FB03	Chromium	0.77	()	$\mu\text{g}/\ell$
BC-FB03	Copper	0.55	()	$\mu\text{g}/\ell$
BC-FB03	Zinc	0.34	()	$\mu\text{g}/\ell$
BC-FB03	Toluene	1.50		$\mu\text{g}/\ell$
BC-FB03	p-Xylene	0.18	()	$\mu\text{g}/\ell$
BC-FB03	m-Xylene	0.18	()	$\mu\text{g}/\ell$
BC-FB06	Arsenic	2.90	()	$\mu\text{g}/\ell$
BC-FB06	Barium	135.00	()	$\mu\text{g}/\ell$
BC-FB06	Chromium	2.90	()	$\mu\text{g}/\ell$
BC-FB06	Copper	23.00	()	$\mu\text{g}/\ell$
BC-FB06	Lead	3.60		$\mu\text{g}/\ell$
BC-FB06	Selenium	3.40	()	$\mu\text{g}/\ell$
BC-FB06	Zinc	638.00		$\mu\text{g}/\ell$

**TABLE E-11 ANALYTES DETECTED IN EQUIPMENT RINSEATES**  
110th Fighter Wing, Michigan ANG, Battle Creek, Michigan

BC-ER1	Chloride	0.00		mg/l
BC-ER1	Dissolved Solids	366.00		mg/l
BC-ER1	Sulfate	0.00		mg/l
BC-ER1	Chloroform	0.22		µg/l
BC-ER1	Tetrachloroethene	0.06		µg/l
BC-ER1	2-Chlorotoluene	3.10		µg/l
BC-ER1	4-Chlorotoluene	0.35		µg/l
BC-ER1	1,2-Dichlorobenzene	0.08		µg/l
BC-ER1	Toluene	3.30		µg/l
BC-ER1	o-Xylene	0.41		µg/l
BC-ER1	Styrene	0.19		µg/l
BC-ER2	Chloroform	0.13		µg/l
BC-ER2	1,1,1-Trichloroethane	0.04		µg/l
BC-ER2	2-Chlorotoluene	1.90		µg/l
BC-ER2	4-Chlorotoluene	0.20		µg/l
BC-ER2	Benzene	0.04	J	µg/l
BC-ER2	Toluene	2.10		µg/l
BC-ER2	p-Xylene	0.07	J	µg/l
BC-ER2	m-Xylene	0.24	J	µg/l
BC-ER2	o-Xylene	0.30	J	µg/l
BC-ER2	1,2-Dichlorobenzene	0.03		µg/l
BC-ER02	Chloroform	3.00	()	µg/l
BC-ER02	Lead	3.10		µg/l
BC-ER3	2-Chlorotoluene	1.20	J	µg/l
BC-ER3	Chloroform	0.17		µg/l
BC-ER3	1,1,1-Trichloroethane	0.05		µg/l
BC-ER3	Toluene	1.60		µg/l
BC-ER3	Aluminum	126.00	()	µg/l
BC-ER3	Calcium	79.00	()	µg/l
BC-ER3	Sodium	359.00	()	µg/l
BC-ER3	Zinc	5.30	()	µg/l
BC-ER3	Chloride	0.00		mg/l
BC-ER3	Dissolved Solids	199.00		mg/l
BC-ER3	Sulfate	2.24		mg/l
BC-ER03	Zinc	2.70	()	µg/l
BC-ER03	Barium	0.64	()	µg/l
BC-ER03	Chromium	0.88	()	µg/l
BC-ER4	Chloroform	0.16		µg/l
BC-ER4	2-Chlorotoluene	0.90	J	µg/l
BC-ER4	p-Xylene	0.07		µg/l
BC-ER4	m-Xylene	0.20		µg/l
BC-ER4	o-Xylene	0.25		µg/l
BC-ER4	Zinc	109.00		µg/l
BC-ER05	Barium	0.46	()	µg/l
BC-ER05	Chromium	0.70	()	µg/l
BC-ER05	Copper	1.10	()	µg/l
BC-ER05	Zinc	1.20	()	µg/l
BC-ER05	Toluene	1.60	P	µg/l
BC-ER06	Toluene	1.30		µg/l
BC-ER07	Toluene	1.30	P	µg/l

toluene, 1,1,1-trichloroethane, xylenes, and zinc were detected in equipment rinseates.

#### **E.3.4 Field Replicates**

Field replicates were used as a measure of sampling precision, sample collection reproducibility, and media variability during the RI at the base. Field RPD values were calculated only for compounds and elements not qualified "B" or "R" during the data validation process. A total of 46 soil samples, 26 water samples, 5 soil duplicate samples, and 4 duplicate water samples were collected. Increased percent differences were expected for all volatile analytes detected in soil samples, since all samples remained in stainless steel sleeves (i.e., not mixed) after the sampling equipment was retrieved from the borehole. The field replicate for each soil analyses was obtained from the adjacent sleeve, water samples were split into different sample containers on sampling. The results of the RPD calculations show that 47 sample/duplicate pairs failed to meet the RPD criteria. Based on the RPD values calculated, 1062 of the 1109 RPDs calculated, from the sample/duplicate pairs, met the associated RPD criteria. This represents a sampling precision of 96%. As a result, the DQOs for analytical precision has been met.

#### **E.4 LABORATORY QUALITY CONTROL ASSESSMENT**

All environmental samples collected at the Kellogg ANG base were analyzed using the test methods and general chemical methodology from the following references:

- ***Statement of Work For Organic Analysis, Multi-Media, Multi-Concentration***, EPA Contract Laboratory Program, 3/90 (VOCs [soil], SVOCs)
- ***Statement of Work For Organic Analysis, Multi-Media, Multi-Concentration***, EPA Contract Laboratory Program, 10/92 (SVOCs)
- ***Test Methods for Evaluating Solid Waste, Physical/ Chemical Methods***, SW-846, Third Edition, September 1986, with 1989 revisions (VOCs [water], metals)
- ***Methods for Chemical Analyses of Water and Wastes***, EPA 600/4-79-020, EPA 1983 revisions (Sulfate, Chloride, Nitrate, and Total Dissolved Solids)

HAZWRAP Level C documentation was required and submitted by the laboratory for all analyses. All data were validated and qualified using the guidelines and specifications described in the following documents:

- ***Laboratory Data Validation functional Guidelines for Evaluating Inorganic Analyses***, EPA Contract Laboratory Program, February 1988, ( metals)
- ***Requirements for Quality Control of Analytical Data***, Hazardous Waste Remedial Actions Program (DOE/HWP-65/R1), July 1990 (VOCs and SVOCs)

In addition to the above guidelines, additional steps were taken to make the data validation process clearer to the data user. The laboratory "J" qualifier, "B" qualifier for metals, was removed from detects below the quantitation limit and was replaced with a "( )" qualifier prior to validation. A "B" qualifier was used to indicate possible blank contamination. In these cases the 5x and 10x rule was applied.

All data validation qualifiers used were applied to the data as required by the aforementioned guidelines. A complete summary of all data obtained and the qualifiers applied to that data is presented in Appendix F.

**APPENDIX F: LABORATORY DATA AND QA/QC  
VALIDATION SUMMARIES**

# Appendix F: Complete Analytical Database 110th FG, MIANG, Battle Creek, Michigan

LOCATOR: SAMPLE ID: COLLECTION DATE: ASSOCIATED QC:	BGSS01 BC-BG-SS01 12/17/94 BC-TB3,BC-ER2 BC-FB1, BC-FB2		BGSS02 BC-BG-SS02 12/17/94 BC-TB3,BC-ER2 BC-FB1, BC-FB2		BGSS03 BC-BG-SS03 12/17/94 BC-TB3,BC-ER2 BC-FB1, BC-FB2		BGSS03D BC-BG-SS03D 12/17/94 BC-TB3,BC-ER2 BC-FB1, BC-FB2		BGSS04 BC-BG-SS04 12/17/94 BC-TB3,BC-ER2 BC-FB1, BC-FB2		BGSB1 BC-BG1-05-07 12/17/94 BC-TB3,BC-ER2 BC-FB1, BC-FB2	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Volatiles Compounds by 8240												
1,1,1-Trichloroethane	6	U	6	U	6	U	6	U	6	U	6	U
1,1,2,2-Tetrachloroethane	11	U	11	U	11	U	12	U	11	U	12	U
1,1,2-Trichloroethane	6	U	6	U	6	U	6	U	6	U	6	U
1,1-Dichloroethane	6	U	6	U	6	U	6	U	6	U	6	U
1,1-Dichloroethane	6	U	6	U	6	U	6	U	6	U	6	U
1,2-Dichloroethane	6	U	6	U	6	U	6	U	6	U	6	U
1,2-Dichloroethane(Total)	-		-		-		-		-		-	
1,2-Dichloropropane	6	U	6	U	6	U	6	U	6	U	6	U
2-Butanone	22	U	22	U	23	U	23	U	22	U	24	U
2-Hexanone	17	U	17	U	17	U	17	U	17	U	18	U
4-Methyl-2-pentanone	17	U	17	U	17	U	17	U	17	U	18	U
Acetone	11	U	11	U	11	U	18	B	11	U	37	B
Benzene	6	U	6	U	6	U	6	U	6	U	6	U
Bromodichloromethane	6	U	6	U	6	U	6	U	6	U	6	U
Bromoform	11	U	11	U	11	U	12	U	11	U	12	U
Bromomethane	6	U	6	U	6	U	6	U	6	U	6	U
Carbon disulfide	6	U	6	U	6	U	6	U	6	U	6	U
Carbon tetrachloride	6	U	6	U	6	U	6	U	6	U	6	U
Chlorobenzene	6	U	6	U	6	U	6	U	6	U	6	U
Chloroethane	11	U	11	U	11	U	12	U	11	U	12	U
Chloroform	6	U	6	U	6	U	6	U	6	U	6	U
Chloromethane	11	U	11	U	11	U	12	U	11	U	12	U
Cis-1,2-Dichloroethene	6	U	6	U	6	U	6	U	6	U	6	U
Cis-1,3-Dichloropropene	6	U	6	U	6	U	6	U	6	U	6	U
Dibromochloromethane	6	U	6	U	6	U	6	U	6	U	6	U
Ethylbenzene	6	U	6	U	6	U	6	U	6	U	6	U
Methylene chloride	85	B	58	B	41	B	15	B	35	B	17	B
Styrene	6	U	6	U	6	U	6	U	6	U	6	U
Tetrachloroethene	6	U	6	U	6	U	6	U	6	U	6	U
Toluene	6	U	6	U	6	U	6	U	6	U	6	U
Trans-1,2-Dichloroethene	6	U	6	U	6	U	6	U	6	U	6	U
Trans-1,3-Dichloropropene	6	U	6	U	6	U	6	U	6	U	6	U
Trichloroethene	6	U	6	U	6	U	6	U	6	U	6	U
Vinyl acetate	11	U	11	U	11	U	12	U	11	U	12	U
Vinyl chloride	11	U	11	U	11	U	12	U	11	U	12	U

**Appendix F: Complete Analytical Database**  
**110th FG, MIANG, Battle Creek, Michigan**

LOCATOR:  
SAMPLE ID:  
COLLECTION DATE:  
ASSOCIATED QC:

BGSS01  
BC-BG-SS01  
12/17/94  
BC-TB3, BC-ER2  
BC-FB1, BC-FB2

BGSS02  
BC-BG-SS02  
12/17/94  
BC-TB3, BC-ER2  
BC-FB1, BC-FB2

BGSS03  
BC-BG-SS03  
12/17/94  
BC-TB3, BC-ER2  
BC-FB1, BC-FB2

BGSS03D  
BC-BG-SS03D  
12/17/94  
BC-TB3, BC-ER2  
BC-FB1, BC-FB2

BGSS04  
BC-BG-SS04  
12/17/94  
BC-TB3, BC-ER2  
BC-FB1, BC-FB2

BGSB1  
BC-BG1-05-07  
12/17/94  
BC-TB3, BC-ER2  
BC-FB1, BC-FB2

RESULT QUAL RESULT QUAL RESULT QUAL RESULT QUAL RESULT QUAL

Xylenes (Total)

Semivolatiles Compounds by CLP

1,2,4-Trichlorobenzene	730	U	730	U	740	U	770	U	740	U	800	U
1,2-Dichlorobenzene	730	U	730	U	740	U	770	U	740	U	800	U
1,3-Dichlorobenzene	730	U	730	U	740	U	770	U	740	U	800	U
1,4-Dichlorobenzene	730	U	730	U	740	U	770	U	740	U	800	U
1-Methylnaphthalene	-	U	-	U	-	U	-	U	-	U	-	U
2,2'-Oxybis(1-chloropropane)	730	U	730	U	740	U	770	U	740	U	800	U
2,4,5-Trichlorophenol	1800	U	1800	U	1800	U	1900	U	1800	U	2000	U
2,4,6-Trichlorophenol	730	U	730	U	740	U	770	U	740	U	800	U
2,4-Dichlorophenol	730	U	730	U	740	U	770	U	740	U	800	U
2,4-Dimethylphenol	730	U	730	U	740	U	770	U	740	U	800	U
2,4-Dinitrophenol	1800	U	1800	U	1800	U	1900	U	1800	U	2000	U
2,4-Dinitrotoluene	730	U	730	U	740	U	770	U	740	U	800	U
2,6-Dinitrotoluene	730	U	730	U	740	U	770	U	740	U	800	U
2-Chloronaphthalene	730	U	730	U	740	U	770	U	740	U	800	U
2-Chlorophenol	730	U	730	U	740	U	770	U	740	U	800	U
2-Methylnaphthalene	730	U	730	U	1900	U	1700	U	1600	U	800	U
2-Methylphenol	730	U	730	U	740	U	770	U	740	U	800	U
2-Nitroaniline	1800	U	1800	U	1800	U	1900	U	1800	U	2000	U
2-Nitrophenol	730	U	730	U	740	U	770	U	740	U	800	U
3,3'-Dichlorobenzidine	730	U	730	U	740	U	770	U	740	U	800	U
3-Nitroaniline	1800	U	1800	U	1800	U	1900	U	1800	U	2000	U
4,6-Dinitro-2-methylphenol	1800	U	1800	U	1800	U	1900	U	1800	U	2000	U
4-Bromophenyl phenyl ether	730	U	730	U	740	U	770	U	740	U	800	U
4-Chloro-3-methylphenol	730	U	730	U	740	U	770	U	740	U	800	U
4-Chloroaniline	730	U	730	U	740	U	770	U	740	U	800	U
4-Chlorophenyl phenyl ether	730	U	730	U	740	U	770	U	740	U	800	U
4-Methylphenol	730	U	730	U	740	U	770	U	740	U	800	U
4-Nitroaniline	1800	U	1800	U	1800	U	1900	U	1800	U	2000	U
4-Nitrophenol	1800	U	1800	U	1800	U	1900	U	1800	U	2000	U
Acenaphthene	730	U	730	U	920	U	780	U	780	U	800	U
Acenaphthylene	730	U	730	U	1300	U	1200	U	1000	U	800	U
Anthracene	730	U	730	U	820	U	670	U	880	U	800	U
Benzo(a)anthracene	730	U	730	U	7000	U	3100	U	5100	U	800	U



**Appendix F: Complete Analytical Database**  
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:  
SAMPLE ID:  
COLLECTION DATE:  
ASSOCIATED QC:

BGSS01  
BC-BG-SS01  
12/17/94  
BC-TB3,BC-ER2  
BC-FB1, BC-FB2

BGSS02  
BC-BG-SS02  
12/17/94  
BC-TB3,BC-ER2  
BC-FB1, BC-FB2

BGSS03  
BC-BG-SS03  
12/17/94  
BC-TB3,BC-ER2  
BC-FB1, BC-FB2

BGSS04  
BC-BG-SS04  
12/17/94  
BC-TB3,BC-ER2  
BC-FB1, BC-FB2

BGSB1  
BC-BG1-05-07  
12/17/94  
BC-TB3,BC-ER2  
BC-FB1, BC-FB2

	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Benzo(a)pyrene	730	U	730	U	3700		3400		3400		800	U
Benzo(b)fluoranthene	730	U	730	U	13000		8200		12000		800	U
Benzo(g,h,i)perylene	730	U	730	U	1100		2200		860		800	U
Benzo(k)fluoranthene	730	U	730	U	16000		7200		15000		800	U
Butyl benzyl phthalate	730	U	730	U	740	U	770	U	740	U	800	U
Carbazole	730	U	730	U	1700		1600		1400		800	U
Chrysene	730	U	730	U	5900		5000		5200		800	U
Di-n-butyl phthalate	120	U	290	U	170	U	770	U	740	U	140	U
Di-n-octyl phthalate	730	U	730	U	740	U	770	U	740	U	800	U
Dibenzo(a,h)anthracene	730	U	730	U	490	U	830	U	370	U	800	U
Dibenzofuran	730	U	730	U	1100		1100		970		800	U
Diethyl phthalate	730	U	730	U	740	U	770	U	740	U	800	U
Dimethyl phthalate	730	U	730	U	740	U	770	U	740	U	800	U
Fluoranthene	730	U	730	U	24000		13000		23000		800	U
Fluorene	730	U	730	U	2000		2000		1500		800	U
Hexachlorobenzene	730	U	730	U	740	U	770	U	740	U	800	U
Hexachlorobutadiene	730	U	730	U	740	U	770	U	740	U	800	U
Hexachlorocyclopentadiene	730	U	730	U	740	U	770	U	740	U	800	U
Hexachloroethane	730	U	730	U	740	U	770	U	740	U	800	U
Indeno(1,2,3-cd)pyrene	730	U	730	U	1600		2700		1200		800	U
Isophorone	730	U	730	U	740	U	770	U	740	U	800	U
N-Nitroso-di-n-propylamine	730	U	730	U	740	U	770	U	740	U	800	U
N-Nitrosodiphenylamine(1)	730	U	730	U	740	U	770	U	740	U	800	U
Naphthalene	730	U	730	U	1700		1500		1100		800	U
Nitrobenzene	730	U	730	U	740	U	770	U	740	U	800	U
Pentachlorophenol	1800	U	1800	U	1800	U	1900	U	1800	U	2000	U
Phenanthrene	730	U	730	U	29000		13000		28000		800	U
Phenol	730	U	730	U	740	U	770	U	740	U	800	U
Pyrene	730	U	730	U	5900		11000		5600		800	U
bis(2-Chloroethoxy)methane	730	U	730	U	740	U	770	U	740	U	800	U
bis(2-Chloroethyl)ether	730	U	730	U	740	U	770	U	740	U	800	U
bis(2-Ethylhexyl)phthalate	730	U	730	U	740	U	770	U	740	U	800	U

Metals by CLP

Antimony	R	J	0.27	U	4.20	R	3.20	R	2.20	R	J
Arsenic			6.10	J							

**Appendix F: Complete Analytical Database**  
**110th FG, MIANG, Battle Creek, Michigan**

LOCATOR:  
SAMPLE ID:  
COLLECTION DATE:  
ASSOCIATED QC:

BGSS01  
BC-BG-SS01  
12/17/94  
BC-TB3,BC-ER2  
BC-FB1, BC-FB2

BGSS02  
BC-BG-SS02  
12/17/94  
BC-TB3,BC-ER2  
BC-FB1, BC-FB2

BGSS03  
BC-BG-SS03  
12/17/94  
BC-TB3,BC-ER2  
BC-FB1, BC-FB2

BGSS03  
BC-BG-SS03D  
12/17/94  
BC-TB3,BC-ER2  
BC-FB1, BC-FB2

BGSS04  
BC-BG-SS04  
12/17/94  
BC-TB3,BC-ER2  
BC-FB1, BC-FB2

BGSSB1  
BC-BG1-05-07  
12/17/94  
BC-TB3,BC-ER2  
BC-FB1, BC-FB2

	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Barium	36.90		13.90	()	37.50	()	35.10		47.80		6.10	()
Beryllium	0.17	()	0.08	()B	0.18	()	0.18	()	0.17	()	0.06	()B
Cadmium	0.06	U	0.05	U	0.06	U	0.06	U	0.06	U	0.06	U
Chromium	6.80		3.60		8.30		6.50		12.80	J	4	
Chromium, Cr+6	-		-		-		-		-		-	
Copper	4.90		2.60	()	5.70		5.10		4.30		4.10	
Lead	6.50		2.70		11.10		10.30		7.20		2.90	
Mercury	0.11	U	0.10	U	0.11	U	0.11	U	0.11	U	0.10	U
Nickel	5.70		3.20	()	6.30		5.40		7.90		4.80	
Selenium	0.49	UJ	0.48	UJ	0.63	J	0.51	UJ	0.49	UJ	0.52	UJ
Silver	0.50	UJ	0.49	UJ	0.51	UJ	0.53	UJ	0.50	UJ	0.54	UJ
Thallium	0.30	U	0.31	()	0.38	()	0.32	U	0.39	()	0.32	U
Zinc	17.10	J	8	J	20.10	J	18.10	J	15	J	13.70	J

**Appendix F: Complete Analytical Database**  
110th FG, MIANG, Battle Creek, Michigan

LOCATOR: SAMPLE ID: COLLECTION DATE: ASSOCIATED QC:	BGSB2		BGSB3		BGSB4		1B1		1B1		1B1	
	BC-BG2-05-07 12/17/94	QUAL	BC-BG3-05-07 12/17/94	QUAL	BC-BG4-05-07 12/17/94	QUAL	BC-B1-00-01 11/07/94	QUAL	BC-B1-00-01D 11/07/94	QUAL	BC-B1-05-07 11/07/94	QUAL
	BC-TB3,BC-ER2 BC-FB1, BC-FB2	BC-TB3,BC-ER2 BC-FB1, BC-FB2	BC-TB3,BC-ER2 BC-FB1, BC-FB2	BC-TB3,BC-ER2 BC-FB1, BC-FB2	BC-TB3,BC-ER2 BC-FB1, BC-FB2	BC-TB3,BC-ER2 BC-FB1, BC-FB2	BC-TB2,BC-ER5 BC-FB3, BC-FB6	BC-TB2,BC-ER5 BC-FB3, BC-FB6	BC-TB2,BC-ER5 BC-FB3, BC-FB6	BC-TB2,BC-ER5 BC-FB3, BC-FB6	BC-TB2,BC-ER5 BC-FB3, BC-FB6	BC-TB2,BC-ER5 BC-FB3, BC-FB6
Volatiles Compounds by 8240	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
1,1,1-Trichloroethane	5	U	5	U	5	U	6	U	6	U	6	U
1,1,2,2-Tetrachloroethane	11	U	11	U	10	U	11	U	11	U	11	U
1,1,2-Trichloroethane	5	U	5	U	5	U	6	U	6	U	6	U
1,1-Dichloroethane	5	U	5	U	5	U	6	U	6	U	6	U
1,1-Dichloroethane	5	U	5	U	5	U	6	U	6	U	6	U
1,2-Dichloroethane	5	U	5	U	5	U	6	U	6	U	6	U
1,2-Dichloroethane(Total)	-	U	-	U	-	U	-	U	-	U	-	U
1,2-Dichloropropane	22	U	22	U	21	U	23	U	23	U	22	U
2-Butanone	16	U	16	U	16	U	17	U	17	U	17	U
2-Hexanone	16	U	16	U	16	U	17	U	17	U	17	U
4-Methyl-2-pentanone	11	U	18	B	33	B	14	B	16	B	26	U
Acetone	5	U	5	U	5	U	6	U	6	U	6	U
Benzene	5	U	5	U	5	U	6	U	6	U	6	U
Bromodichloromethane	11	U	11	U	10	U	11	U	11	U	11	U
Bromoform	5	U	5	U	5	U	6	U	6	U	6	U
Bromomethane	5	U	5	U	5	U	6	U	6	U	6	U
Carbon disulfide	5	U	5	U	5	U	6	U	6	U	6	U
Carbon tetrachloride	5	U	5	U	5	U	6	U	6	U	6	U
Chlorobenzene	11	U	11	U	10	U	11	U	11	U	11	U
Chloroethane	5	U	5	U	5	U	6	U	6	U	6	U
Chloroform	11	U	11	U	10	U	11	U	11	U	11	U
Chloromethane	5	U	5	U	5	U	6	U	6	U	6	U
Cis-1,2-Dichloroethene	5	U	5	U	5	U	6	U	6	U	6	U
Cis-1,3-Dichloropropene	5	U	5	U	5	U	6	U	6	U	6	U
Dibromochloromethane	5	U	5	U	5	U	6	U	6	U	6	U
Ethylbenzene	5	U	5	U	5	U	6	U	6	U	6	U
Methylene chloride	25	B	16	B	17	B	12	B	14	B	11	B
Styrene	5	U	5	U	5	U	6	U	6	U	6	U
Tetrachloroethene	5	U	5	U	5	U	6	U	6	U	6	U
Toluene	5	U	5	U	5	U	6	U	6	U	6	U
Trans-1,2-Dichloroethene	5	U	5	U	5	U	6	U	6	U	6	U
Trans-1,3-Dichloropropene	5	U	5	U	5	U	6	U	6	U	6	U
Trichloroethene	5	U	5	U	5	U	6	U	6	U	6	U
Vinyl acetate	11	U	11	U	10	U	11	U	11	U	11	U
Vinyl chloride	11	U	11	U	10	U	11	U	11	U	11	U

**Appendix F: Complete Analytical Database**  
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:  
SAMPLE ID:  
COLLECTION DATE:  
ASSOCIATED QC:

BGSB2  
BC-BG2-05-07  
12/17/94  
BC-TB3,BC-ER2  
BC-FB1, BC-FB2

BGSB3  
BC-BG3-05-07  
12/17/94  
BC-TB3,BC-ER2  
BC-FB1, BC-FB2

BGSB4  
BC-BG4-05-07  
12/17/94  
BC-TB3,BC-ER2  
BC-FB1, BC-FB2

BGSB2  
BC-BG2-05-07  
12/17/94  
BC-TB3,BC-ER2  
BC-FB1, BC-FB2

BGSB3  
BC-BG3-05-07  
12/17/94  
BC-TB3,BC-ER2  
BC-FB1, BC-FB2

BGSB4  
BC-BG4-05-07  
12/17/94  
BC-TB3,BC-ER2  
BC-FB1, BC-FB2

	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Xylenes (Total)	16	U	16	U	16	U	17	U	17	U	17	U	17	U
Semivolatiles Compounds by CLP														
1,2,4-Trichlorobenzene	710	U	710	U	690	U	380	U	380	U	380	U	360	U
1,2-Dichlorobenzene	710	U	710	U	690	U	380	U	380	U	380	U	360	U
1,3-Dichlorobenzene	710	U	710	U	690	U	380	U	380	U	380	U	360	U
1,4-Dichlorobenzene	710	U	710	U	690	U	380	U	380	U	380	U	360	U
1-Methylnaphthalene	-	U	-	U	-	U	-	U	-	U	-	U	-	U
2,2'-Oxybis(1-chloropropane)	710	U	710	U	690	U	380	U	380	U	380	U	360	U
2,4,5-Trichlorophenol	1700	U	1700	U	1700	U	910	U	910	U	910	U	880	U
2,4,6-Trichlorophenol	710	U	710	U	690	U	380	U	380	U	380	U	360	U
2,4-Dichlorophenol	710	U	710	U	690	U	380	U	380	U	380	U	360	U
2,4-Dimethylphenol	710	U	710	U	690	U	380	U	380	U	380	U	360	U
2,4-Dinitrophenol	1700	U	1700	U	1700	U	910	U	910	U	910	U	880	U
2,4-Dinitrotoluene	710	U	710	U	690	U	380	U	380	U	380	U	360	U
2,6-Dinitrotoluene	710	U	710	U	690	U	380	U	380	U	380	U	360	U
2-Chloronaphthalene	710	U	710	U	690	U	380	U	380	U	380	U	360	U
2-Chlorophenol	710	U	710	U	690	U	380	U	380	U	380	U	360	U
2-Methylnaphthalene	710	U	710	U	690	U	380	U	380	U	380	U	360	U
2-Methylphenol	710	U	710	U	690	U	380	U	380	U	380	U	360	U
2-Nitroaniline	1700	U	1700	U	1700	U	910	U	910	U	910	U	880	U
2-Nitrophenol	710	U	710	U	690	U	380	U	380	U	380	U	360	U
3,3'-Dichlorobenzidine	710	U	710	U	690	U	380	U	380	U	380	U	360	U
3-Nitroaniline	1700	U	1700	U	1700	U	910	U	910	U	910	U	880	U
4,6-Dinitro-2-methylphenol	1700	U	1700	U	1700	U	910	U	910	U	910	U	880	U
4-Bromophenyl phenyl ether	710	U	710	U	690	U	380	U	380	U	380	U	360	U
4-Chloro-3-methylphenol	710	U	710	U	690	U	380	U	380	U	380	U	360	U
4-Chloroaniline	710	U	710	U	690	U	380	U	380	U	380	U	360	U
4-Chlorophenyl phenyl ether	710	U	710	U	690	U	380	U	380	U	380	U	360	U
4-Methylphenol	710	U	710	U	690	U	380	U	380	U	380	U	360	U
4-Nitroaniline	1700	U	1700	U	1700	U	910	U	910	U	910	U	880	U
4-Nitrophenol	1700	U	1700	U	1700	U	910	U	910	U	910	U	880	U
Acenaphthene	710	U	710	U	690	U	380	U	380	U	380	U	360	U
Acenaphthylene	710	U	710	U	690	U	380	U	380	U	380	U	360	U
Anthracene	710	U	710	U	690	U	380	U	380	U	380	U	360	U
Benzo(a)anthracene	710	U	110	U	690	U	280	U	380	U	380	U	360	U

**Appendix F: Complete Analytical Database**  
110th FG, MIANG, Battle Creek, Michigan

LOCATOR: SAMPLE ID: COLLECTION DATE: ASSOCIATED QC:	BGSB2		BGSB3		BGSB4		1B1		1B1		1B1	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Benzo(a)pyrene	710	U	92	U	690	U	210	U	380	U	360	U
Benzo(b)fluoranthene	710	U	240	U	690	U	370	U	48	U	360	U
Benzo(g,h,i)perylene	710	U	710	U	690	U	140	U	380	U	360	U
Benzo(k)fluoranthene	710	U	220	U	690	U	390	U	51	U	360	U
Butyl benzyl phthalate	710	U	710	U	690	U	380	U	380	U	360	U
Carbazole	710	U	710	U	690	U	98	U	380	U	360	U
Chrysene	710	U	190	U	690	U	250	U	380	U	360	U
Di-n-butyl phthalate	220	U	130	U	230	U	380	U	70	U	360	U
Di-n-octyl phthalate	710	U	710	U	690	U	380	U	380	U	360	U
Dibenzo(a,h)anthracene	710	U	710	U	690	U	380	U	380	U	360	U
Dibenzofuran	710	U	710	U	690	U	320	U	380	U	360	U
Diethyl phthalate	710	U	710	U	690	U	380	U	380	U	360	U
Dimethyl phthalate	710	U	710	U	690	U	380	U	380	U	360	U
Fluoranthene	80	U	430	U	690	U	780	U	94	U	360	U
Fluorene	710	U	710	U	690	U	290	U	380	U	360	U
Hexachlorobenzene	710	U	710	U	690	U	380	U	380	U	360	U
Hexachlorobutadiene	710	U	710	U	690	U	380	U	380	U	360	U
Hexachlorocyclopentadiene	710	U	710	U	690	U	380	U	380	U	360	U
Hexachloroethane	710	U	710	U	690	U	380	U	380	U	360	U
Indeno(1,2,3-cd)pyrene	710	U	710	U	690	U	120	U	380	U	360	U
Isophorone	710	U	710	U	690	U	380	U	380	U	360	U
N-Nitroso-di-n-propylamine	710	U	710	U	690	U	380	U	380	U	360	U
N-Nitrosodiphenylamine(1)	710	U	710	U	690	U	380	U	380	U	360	U
Naphthalene	710	U	710	U	690	U	110	U	380	U	360	U
Nitrobenzene	710	U	710	U	690	U	380	U	380	U	360	U
Pentachlorophenol	1700	U	1700	U	1700	U	910	U	910	U	880	U
Phenanthrene	710	U	470	U	690	U	990	U	85	U	360	U
Phenol	710	U	710	U	690	U	380	U	380	U	360	U
Pyrene	710	U	370	U	690	U	580	U	71	U	360	U
bis(2-Chloroethoxy)methane	710	U	710	U	690	U	380	U	380	U	360	U
bis(2-Chloroethyl)ether	710	U	710	U	690	U	380	U	380	U	360	U
bis(2-Ethylhexyl)phthalate	710	U	710	U	690	U	380	U	380	U	360	U

**Metals by CLP**

Antimony	0.25	(U)	R	J	4.80	J	R	J	0.13	UJ	0.13	UJ
Arsenic	2.80	J							3.10	J	4.30	

**Appendix F: Complete Analytical Database**  
**110th FG, MIANG, Battle Creek, Michigan**

LOCATOR:  
SAMPLE ID:  
COLLECTION DATE:  
ASSOCIATED QC:

BGSB2 BC-BG2-05-07 12/17/94 BGSB3 BC-BG3-05-07 12/17/94 BGSB4 BC-BG4-05-07 12/17/94 1B1 BC1-B1-00-01 11/07/94 1B1 BC1-B1-00-01D 11/07/94 1B1 BC1-B1-05-07 11/07/94  
BC-TB3,BC-ER2 BC-FB1, BC-FB2 BC-TB3,BC-ER2 BC-FB1, BC-FB2 BC-TB3,BC-ER2 BC-FB1, BC-FB2 BC-TB2,BC-ER5 BC-FB3, BC-FB6 BC-TB2,BC-ER5 BC-FB3, BC-FB6 BC-TB2,BC-ER4 BC-FB3, BC-FB6

	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Barium	6.30	()	6.60	()	8.60	()	32.70		27.90		31.10	
Beryllium	0.06	()B	0.05	()B	0.04	()B	0.21		0.21	()	0.23	()
Cadmium	0.05	U	0.05	U	0.05	U	0.03		0.03	U	0.03	U
Chromium	4		4		5.50		8.70		8.20		11.20	
Chromium, Cr+6	-		-		-		-		-		-	
Copper	3.80		3.80		3.70		5.70		6.30		5.90	
Lead	2.80		2.10		2.50		24.80		29.90		4.40	
Mercury	0.09	U	0.10	U	0.10	U	-		-		-	
Nickel	4.10	()	4.40		5.50		7.10		7.50		9.40	
Selenium	0.47	UJ	0.46	UJ	0.44	UJ	0.32	()J	0.32	UJ	0.30	UJ
Silver	0.48	UJ	0.47	UJ	0.45	UJ	0.04	U	0.05	U	0.04	U
Thallium	0.29	U	0.28	UJ	0.32	()	0.33	U	0.35	U	0.32	U
Zinc	16.30	J	8.50	J	8.50	J	17.60	J	18.20	J	15.80	J

**Appendix F: Complete Analytical Database**  
110th FG, MIANG, Battle Creek, Michigan

	LOCATOR:		1B1		1B2		1B2		1B2		1B3		1B3	
	SAMPLE ID:	COLLECTION DATE:	BC1-B1-20-22	11/06/94	BC1-B2-00-01	11/07/94	BC1-B2-10-12	11/07/94	BC1-B2-20-22	11/06/94	BC1-B3-00-01	11/07/94	BC1-B3-20-22	11/08/94
	ASSOCIATED QC:		BC-TB1,BC-ER5	BC-FB3, BC-FB6	BC-TB2,BC-ER5	BC-FB3, BC-FB6	BC-TB2,BC-ER5	BC-FB3, BC-FB6	BC-TB1,BC-ER5	BC-FB3, BC-FB6	BC-TB1,BC-ER5	BC-FB3, BC-FB6	BC-TB3,BC-ER6	BC-FB3, BC-FB6
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Volatiles Compounds by 8240														
1,1,1-Trichloroethane	6	U	6	U	5	U	5	U	5	U	6	U	6	U
1,1,2,2-Tetrachloroethane	12	U	11	U	11	U	11	U	11	U	11	U	11	U
1,1,2-Trichloroethane	6	U	6	U	5	U	5	U	5	U	6	U	6	U
1,1-Dichloroethane	6	U	6	U	5	U	5	U	5	U	6	U	6	U
1,1-Dichloroethane	6	U	6	U	5	U	5	U	5	U	6	U	6	U
1,2-Dichloroethane	6	U	6	U	5	U	5	U	5	U	6	U	6	U
1,2-Dichloroethane(Total)	-													
1,2-Dichloropropane	6	U	6	U	5	U	5	U	5	U	6	U	6	U
2-Butanone	24	U	23	U	22	U	22	U	22	U	22	U	23	U
2-Hexanone	18	U	17	U	16	U	16	U	16	U	17	U	17	U
4-Methyl-2-pentanone	18	U	17	U	16	U	16	U	16	U	17	U	17	U
Acetone	17	B	11	U	17	U	17	U	15	B	9	U	29	B
Benzene	6	U	6	U	5	U	5	U	5	U	6	U	6	U
Bromodichloromethane	6	U	6	U	5	U	5	U	5	U	6	U	6	U
Bromoform	12	U	11	U	11	U	11	U	11	U	11	U	11	U
Bromomethane	6	U	6	U	5	U	5	U	5	U	6	U	6	U
Carbon disulfide	6	U	6	U	5	U	5	U	5	U	6	U	6	U
Carbon tetrachloride	6	U	6	U	5	U	5	U	5	U	6	U	6	U
Chlorobenzene	6	U	6	U	5	U	5	U	5	U	6	U	6	U
Chloroethane	12	U	11	U	11	U	11	U	11	U	11	U	11	U
Chloroform	6	U	6	U	5	U	5	U	5	U	6	U	6	U
Chloromethane	12	U	11	U	11	U	11	U	11	U	11	U	11	U
Cis-1,2-Dichloroethane	6	U	6	U	5	U	5	U	5	U	6	U	6	U
Cis-1,3-Dichloropropene	6	U	6	U	5	U	5	U	5	U	6	U	6	U
Dibromochloromethane	6	U	6	U	5	U	5	U	5	U	6	U	6	U
Ethylbenzene	6	U	6	U	5	U	5	U	5	U	6	U	6	U
Methylene chloride	12	B	16	B	10	U	10	U	9	U	13	B	14	B
Styrene	6	U	6	U	5	U	5	U	5	U	6	U	6	U
Tetrachloroethane	6	U	6	U	5	U	5	U	5	U	6	U	6	U
Toluene	6	U	6	U	5	U	5	U	5	U	6	U	6	U
Trans-1,2-Dichloroethane	6	U	6	U	5	U	5	U	5	U	6	U	6	U
Trans-1,3-Dichloropropene	6	U	6	U	5	U	5	U	5	U	6	U	6	U
Trichloroethane	6	U	6	U	5	U	5	U	5	U	6	U	6	U
Vinyl acetate	12	U	11	U	11	U	11	U	11	U	11	U	11	U
Vinyl chloride	12	U	11	U	11	U	11	U	11	U	11	U	11	U

**Appendix F: Complete Analytical Database**  
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:  
SAMPLE ID:  
COLLECTION DATE:  
ASSOCIATED QC:

1B1  
BC1-B1-20-22  
11/06/94  
BC-TB1,BC-ER5  
BC-FB3, BC-FB6

1B2  
BC1-B2-00-01  
11/07/94  
BC-TB2,BC-ER5  
BC-FB3, BC-FB6

1B2  
BC1-B2-10-12  
11/07/94  
BC-TB2,BC-ER5  
BC-FB3, BC-FB6

1B2  
BC1-B2-20-22  
11/06/94  
BC-TB1,BC-ER5  
BC-FB3, BC-FB6

1B3  
BC1-B3-00-01  
11/07/94  
BC-TB1,BC-ER5  
BC-FB3, BC-FB6

1B3  
BC1-B3-20-22  
11/08/94  
BC-TB3,BC-ER6  
BC-FB3, BC-FB6

	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Xylenes (Total)	18	U		U		U		U		U		U
Semivolatiles Compounds by CLP												
1,2,4-Trichlorobenzene	390	U		U		U		U		U		U
1,2-Dichlorobenzene	390	U		U		U		U		U		U
1,3-Dichlorobenzene	390	U		U		U		U		U		U
1,4-Dichlorobenzene	390	U		U		U		U		U		U
1-Methylnaphthalene	-											
2,2'-Oxybis(1-chloropropane)	390	U		U		U		U		U		U
2,4,5-Trichlorophenol	950	U		U		U		U		U		U
2,4,6-Trichlorophenol	390	U		U		U		U		U		U
2,4-Dichlorophenol	390	U		U		U		U		U		U
2,4-Dimethylphenol	390	U		U		U		U		U		U
2,4-Dinitrophenol	950	U		U		U		U		U		U
2,4-Dinitrotoluene	390	U		U		U		U		U		U
2,6-Dinitrotoluene	390	U		U		U		U		U		U
2-Chloronaphthalene	390	U		U		U		U		U		U
2-Chlorophenol	390	U		U		U		U		U		U
2-Methylnaphthalene	59	U		U		U		U		U		U
2-Methylphenol	390	U		U		U		U		U		U
2-Nitroaniline	950	U		U		U		U		U		U
2-Nitrophenol	390	U		U		U		U		U		U
3,3'-Dichlorobenzidine	390	U		U		U		U		U		U
3-Nitroaniline	950	U		U		U		U		U		U
4,6-Dinitro-2-methylphenol	950	U		U		U		U		U		U
4-Bromophenyl phenyl ether	390	U		U		U		U		U		U
4-Chloro-3-methylphenol	390	U		U		U		U		U		U
4-Chloroaniline	390	U		U		U		U		U		U
4-Chlorophenyl phenyl ether	390	U		U		U		U		U		U
4-Methylphenol	390	U		U		U		U		U		U
4-Nitroaniline	950	U		U		U		U		U		U
4-Nitrophenol	950	U		U		U		U		U		U
Acenaphthene	390	U		U		U		U		U		U
Acenaphthylene	390	U		U		U		U		U		U
Anthracene	390	U		U		U		U		U		U
Benzo(a)anthracene	390	U		U		U		U		U		U



**Appendix F: Complete Analytical Database**  
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:  
SAMPLE ID:  
COLLECTION DATE:  
ASSOCIATED QC:

1B1  
BC1-B1-20-22  
11/06/94  
BC-TB1, BC-ER5  
BC-FB3, BC-FB6

1B2  
BC1-B2-00-01  
11/07/94  
BC-TB2, BC-ER5  
BC-FB3, BC-FB6

1B2  
BC1-B2-10-12  
11/07/94  
BC-TB2, BC-ER5  
BC-FB3, BC-FB6

1B2  
BC1-B2-20-22  
11/06/94  
BC-TB1, BC-ER5  
BC-FB3, BC-FB6

1B3  
BC1-B3-00-01  
11/07/94  
BC-TB1, BC-ER5  
BC-FB3, BC-FB6

1B3  
BC1-B3-20-22  
11/08/94  
BC-TB3, BC-ER6  
BC-FB3, BC-FB6

	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Benzo(a)pyrene	390	U	55	U	350	U	350	U	480	9400
Benzo(b)fluoranthene	390	U	90	U	350	U	350	U	890	9400
Benzo(g,h,i)perylene	390	U	380	U	350	U	350	U	220	9400
Benzo(k)fluoranthene	390	U	95	U	350	U	350	U	940	9400
Butyl benzyl phthalate	390	U	380	U	350	U	350	U	370	9400
Carbazole	390	U	380	U	350	U	350	U	370	9400
Chrysene	390	U	84	U	350	U	350	U	530	9400
Di-n-butyl phthalate	390	U	380	U	350	U	350	U	370	9400
Di-n-octyl phthalate	390	U	380	U	350	U	350	U	370	9400
Dibenzo(a,h)anthracene	390	U	380	U	350	U	350	U	61	9400
Dibenzofuran	390	U	380	U	350	U	350	U	370	9400
Diethyl phthalate	390	U	380	U	350	U	350	U	370	9400
Dimethyl phthalate	390	U	380	U	350	U	350	U	370	9400
Fluoranthene	390	U	77	U	350	U	350	U	890	9400
Fluorene	62	U	380	U	350	U	350	U	370	6600
Hexachlorobenzene	390	U	380	U	350	U	350	U	370	9400
Hexachlorobutadiene	390	U	380	U	350	U	350	U	370	9400
Hexachlorocyclopentadiene	390	U	380	U	350	U	350	U	370	9400
Hexachloroethane	390	U	380	U	350	U	350	U	370	9400
Indeno(1,2,3-cd)pyrene	390	U	380	U	350	U	350	U	220	9400
Isophorone	390	U	380	U	350	U	350	U	370	9400
N-Nitroso-di-n-propylamine	390	U	380	U	350	U	350	U	370	9400
N-Nitrosodiphenylamine(1)	390	U	380	U	350	U	350	U	370	9400
Naphthalene	390	U	380	U	350	U	460	U	370	10000
Nitrobenzene	390	U	380	U	350	U	350	U	370	9400
Pentachlorophenol	950	U	910	U	850	U	860	U	900	23000
Phenanthrene	390	U	67	U	350	U	190	U	210	9900
Phenol	390	U	380	U	350	U	350	U	370	9400
Pyrene	390	U	110	U	350	U	350	U	750	9400
bis(2-Chloroethoxy)methane	390	U	380	U	350	U	350	U	370	9400
bis(2-Chloroethyl)ether	390	U	380	U	350	U	350	U	370	9400
bis(2-Ethylhexyl)phthalate	390	U	380	U	130	U	350	U	370	9400
Metals by CLP	0.14	UJ	0.13	UJ	0.20	UJ	0.12	UJ	0.13	UJ
Antimony	4.30		1.90		4.10		2.30		5.60	0.14
Arsenic										4.60

**Appendix F: Complete Analytical Database**  
**110th FG, MIANG, Battle Creek, Michigan**

LOCATOR:  
SAMPLE ID:  
COLLECTION DATE:  
ASSOCIATED QC:

1B1  
BC1-B1-20-22  
11/06/94  
BC-TB1, BC-ER5  
BC-FB3, BC-FB6

1B2  
BC1-B2-00-01  
11/07/94  
BC-TB2, BC-ER5  
BC-FB3, BC-FB6

1B2  
BC1-B2-10-12  
11/07/94  
BC-TB2, BC-ER5  
BC-FB3, BC-FB6

1B2  
BC1-B2-20-22  
11/06/94  
BC-TB1, BC-ER5  
BC-FB3, BC-FB6

1B3  
BC1-B3-00-01  
11/07/94  
BC-TB1, BC-ER5  
BC-FB3, BC-FB6

1B3  
BC1-B3-20-22  
11/08/94  
BC-TB3, BC-ER6  
BC-FB3, BC-FB6

	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Barium	18.30	()	9.60	()	7.60	()	9.10	()	25		14	()
Beryllium	0.16	()	0.07	()	0.07	()	0.08	()	0.21		0.14	()
Cadmium	0.04	U	0.03	U	0.03	U	0.08	()B	0.03	U	0.03	U
Chromium	8.60		4.40		48.40		4.30		8.80		10.30	
Chromium, Cr+6	-		-		-		-		-		-	
Copper	7.40		6.90		5.70		4.40		7.80		9.60	
Lead	4.40		37.50		7		3.30		52.60		5.10	
Mercury	-		-		-		-		-		-	
Nickel	19.20		4.60		30.60		6.90		8.10		27.20	
Selenium	0.50	()J	0.31	UJ	0.30	UJ	0.29	UJ	0.31	UJ	0.32	UJ
Silver	0.05	U	0.04	U	0.04	U	0.04	U	0.04	U	0.05	U
Thallium	0.36	U	0.33	U	0.32	U	0.31	U	0.33	U	0.34	U
Zinc	27.30	J	12.80	J	13.20	J	20.20	J	24.30	J	17.30	J

LOCATOR:  
SAMPLE ID:  
COLLECTION DATE:  
ASSOCIATED QC:

Volatiles Compounds by 8240

LOCATOR:  
SAMPLE ID:  
COLLECTION DATE:  
ASSOCIATED QC:

wp\total.wq-June 6, 1995

**Appendix F: Complete Analytical Database**  
**110th FG, MIANG, Battle Creek, Michigan**

LOCATOR:

SAMPLE ID:

COLLECTION DATE:

ASSOCIATED QC:

1B4

BC1-B4-00-01

11/09/94

BC-TB4, BC-ER6

1B4

BC1-B4-10-12

11/06/94

BC-TB1, BC-ER5

1B5

BC1-B5-00-01

11/09/94

BC-TB4, BC-ER6

1B5

BC1-B5-00-01D

11/09/94

BC-TB4, BC-ER6

1B5

BC1-B5-10-12

11/07/94

BC-TB3, BC-ER5

1B5

BC1-B5-20-22

11/07/94

BC-TB2, BC-ER5

RESULT QUAL RESULT QUAL RESULT QUAL RESULT QUAL RESULT QUAL RESULT QUAL

Benzo(a)pyrene	860	U	350	U	100	U	87	U	370	U	350	U
Benzo(b)fluoranthene	1500	U	350	U	200	U	190	U	370	U	350	U
Benzo(g,h,i)perylene	570	U	350	U	69	U	62	U	370	U	350	U
Benzo(k)fluoranthene	1600	U	350	U	210	U	200	U	370	U	350	U
Butyl benzyl phthalate	370	U	350	U	360	U	360	U	370	U	350	U
Carbazole	39	U	350	U	360	U	360	U	370	U	350	U
Chrysene	730	U	350	U	120	U	98	U	370	U	350	U
Di-n-butyl phthalate	66	U	350	U	49	U	47	U	46	U	350	U
Di-n-octyl phthalate	370	U	350	U	360	U	360	U	370	U	350	U
Dibenzo(a,h)anthracene	220	U	350	U	360	U	360	U	370	U	350	U
Dibenzofuran	370	U	350	U	360	U	360	U	370	U	350	U
Diethyl phthalate	370	U	350	U	360	U	360	U	370	U	350	U
Dimethyl phthalate	370	U	350	U	360	U	360	U	370	U	350	U
Fluoranthene	990	U	350	U	160	U	140	U	370	U	350	U
Fluorene	47	U	350	U	360	U	360	U	370	U	350	U
Hexachlorobenzene	370	U	350	U	360	U	360	U	370	U	350	U
Hexachlorobutadiene	370	U	350	U	360	U	360	U	370	U	350	U
Hexachlorocyclopentadiene	370	U	350	U	360	U	360	U	370	U	350	U
Hexachloroethane	370	U	350	U	360	U	360	U	370	U	350	U
Indeno(1,2,3-cd)pyrene	500	U	350	U	71	U	68	U	370	U	350	U
Isophorone	370	U	350	U	360	U	360	U	370	U	350	U
N-Nitroso-di-n-propylamine	370	U	350	U	360	U	360	U	370	U	350	U
N-Nitrosodiphenylamine(1)	370	U	350	U	360	U	360	U	370	U	350	U
Naphthalene	370	U	350	U	360	U	360	U	370	U	350	U
Nitrobenzene	370	U	350	U	360	U	360	U	370	U	350	U
Pentachlorophenol	890	U	840	U	880	U	880	U	890	U	840	U
Phenanthrene	420	U	350	U	56	U	56	U	370	U	350	U
Phenol	370	U	350	U	360	U	360	U	230	U	350	U
Pyrene	1000	U	350	U	140	U	130	U	370	U	350	U
bis(2-Chloroethoxy)methane	370	U	350	U	360	U	360	U	370	U	350	U
bis(2-Chloroethyl)ether	370	U	350	U	360	U	360	U	370	U	350	U
bis(2-Ethylhexyl)phthalate	370	U	350	U	41	U	360	U	370	U	270	U

Metals by CLP

Antimony

Arsenic

0.13

5.40

UJ

UJ

0.12

5.70

0.13

5.70

UJ

UJ

0.14

3.80

0.22

9.20

**Appendix F: Complete Analytical Database**  
**110th FG, MIANG, Battle Creek, Michigan**

LOCATOR:

SAMPLE ID:

COLLECTION DATE:

ASSOCIATED QC:

1B4	1B4	1B5	1B5	1B5	1B5
BC1-B4-00-01	BC1-B4-10-12	BC1-B5-00-01	BC1-B5-00-01D	BC1-B5-10-12	BC1-B5-20-22
11/09/94	11/06/94	11/09/94	11/09/94	11/07/94	11/07/94
BC-TB4, BC-ER6	BC-TB1, BC-ER5	BC-TB4, BC-ER6	BC-TB4, BC-ER6	BC-TB3, BC-ER5	BC-TB2, BC-ER5
BC-FB3, BC-FB6	BC-FB3, BC-FB6	BC-FB3, BC-FB6	BC-FB3, BC-FB6	BC-FB3, BC-FB6	BC-FB3, BC-FB6

	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Barium	34.90		7.30		30.80		28.70		14.80		11	
Beryllium	0.21		0.09		0.21		0.21		0.15		0.16	
Cadmium	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U
Chromium	8.80		9.60		8.40		8		6.60		8.70	
Chromium, Cr+6	-		-		-		-		-		-	
Copper	5.90		4.30		6		6		4.20		5.80	
Lead	16		4.20		8.80		10		3.30		4.70	
Mercury	-		-		-		-		-		-	
Nickel	7.10		8.20		7.60		7.50		5.30		10.50	
Selenium	0.33	UJ	0.29	UJ	0.64	J	0.30	UJ	0.32	UJ	0.28	UJ
Silver	0.04	U	0.12	U	0.04	U	0.04	U	0.05	U	0.04	U
Thallium	0.32	U	0.31	U	0.33	U	0.32	U	0.34	U	0.30	U
Zinc	25.50	J	13.80	J	19	J	18.60	J	11.60	J	13.90	J

# Appendix F: Complete Analytical Database 110th FG, MIANG, Battle Creek, Michigan

LOCATOR: 1B7  
SAMPLE ID: BC1-B7-00-01  
COLLECTION DATE: 11/09/94  
ASSOCIATED QC: BC-TB4,BC-ER7  
BC-FB3, BC-FB6

1B11  
BC1-B11-00-01  
11/10/94  
BC-TB4,BC-ER6  
BC-FB3, BC-FB6

1B9  
BC1-B9-00-01  
11/09/94  
BC-TB4,BC-ER6  
BC-FB3, BC-FB6

1B8  
BC1-B8-20-22  
11/07/94  
BC-TB2,BC-ER5  
BC-FB3, BC-FB6

1B8  
BC1-B8-00-01  
11/09/94  
BC-TB4,BC-ER6  
BC-FB3, BC-FB6

1B7  
BC1-B7-10-12  
11/09/94  
BC-TB4,BC-ER7  
BC-FB3, BC-FB6

	1B7	1B7	1B7	1B8	1B8	1B8	1B9	1B11
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Volatiles Compounds by 8240								
1,1,1-Trichloroethane	6	U	6	U	5	U	5	U
1,1,2,2-Tetrachloroethane	11	U	12	U	11	U	11	U
1,1,2-Trichloroethane	6	U	6	U	5	U	5	U
1,1-Dichloroethane	6	U	6	U	5	U	5	U
1,1-Dichloroethane	6	U	6	U	5	U	5	U
1,2-Dichloroethane	6	U	6	U	5	U	5	U
1,2-Dichloroethane(Total)	-		-		-		-	
1,2-Dichloropropane	6	U	6	U	5	U	5	U
2-Butanone	22	U	24	U	21	U	22	U
2-Hexanone	17	U	18	U	16	U	16	U
4-Methyl-2-pentanone	17	U	18	U	16	U	16	U
Acetone	11	U	12	U	9	U	11	U
Benzene	6	U	6	U	5	U	5	U
Bromodichloromethane	6	U	6	U	5	U	5	U
Bromoform	11	U	12	U	11	U	11	U
Bromomethane	6	U	6	U	5	U	5	U
Carbon disulfide	6	U	6	U	5	U	5	U
Carbon tetrachloride	6	U	6	U	5	U	5	U
Chlorobenzene	6	U	6	U	5	U	5	U
Chloroethane	11	U	12	U	11	U	11	U
Chloroform	6	U	6	U	5	U	5	U
Chloromethane	11	U	12	U	11	U	11	U
Cis-1,2-Dichloroethane	6	U	6	U	5	U	5	U
Cis-1,3-Dichloropropene	6	U	6	U	5	U	5	U
Dibromochloromethane	6	U	6	U	5	U	5	U
Ethylbenzene	6	U	6	U	5	U	5	U
Methylene chloride	8	(B)	9	(B)	11	B	10	B
Styrene	6	U	6	U	5	U	5	U
Tetrachloroethane	6	U	6	U	5	U	5	U
Toluene	6	U	6	U	5	U	5	U
Trans-1,2-Dichloroethane	6	U	6	U	5	U	5	U
Trans-1,3-Dichloropropene	6	U	6	U	5	U	5	U
Trichloroethane	6	U	6	U	5	U	5	U
Vinyl acetate	11	U	12	U	11	U	11	U
Vinyl chloride	11	U	12	U	11	U	11	U

LOCATOR:  
SAMPLE ID:  
COLLECTION DATE:  
ASSOCIATED QC:

wn\total wn- June 6, 1995



LOCATOR:  
SAMPLE ID:  
COLLECTION DATE:  
ASSOCIATED QC:

LOCATOR: SAMPLE ID: COLLECTION DATE: ASSOCIATED QC:	1B7		1B7		1B8		1B8		1B9		1B11	
	BC1-B7-00-01	11/09/94	BC1-B7-10-12	11/09/94	BC1-B8-00-01	11/09/94	BC1-B8-20-22	11/07/94	BC1-B9-00-01	11/09/94	BC1-B11-00-01	11/10/94
	BC-TB4, BC-ER7 BC-FB3, BC-FB6	BC-TB4, BC-ER7 BC-FB3, BC-FB6	BC-TB4, BC-ER7 BC-FB3, BC-FB6	BC-TB4, BC-ER7 BC-FB3, BC-FB6	BC-TB4, BC-ER6 BC-FB3, BC-FB6	BC-TB4, BC-ER6 BC-FB3, BC-FB6	BC-TB2, BC-ER5 BC-FB3, BC-FB6	BC-TB4, BC-ER6 BC-FB3, BC-FB6	BC-TB4, BC-ER6 BC-FB3, BC-FB6	BC-TB4, BC-ER6 BC-FB3, BC-FB6	BC-TB4, BC-ER6 BC-FB3, BC-FB6	BC-TB4, BC-ER6 BC-FB3, BC-FB6
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Benzo(a)pyrene	740		390		600		370		360		360	
Benzo(b)fluoranthene	1600		390		960		370		360		360	
Benzo(g,h,i)perylene	300	()	390		430		370		360		360	
Benzo(k)fluoranthene	1600		390		1000		370		360		360	
Butyl benzyl phthalate	370	U	390		350		370		360		360	
Carbazole	42	()	390		350		370		360		360	
Chrysene	840		390		490		370		360		360	
Di-n-butyl phthalate	50	()	60		46		370		61		60	
Di-n-octyl phthalate	370	U	390		350		370		360		360	
Dibenzo(a,h)anthracene	100	()	390		170		370		360		360	
Dibenzofuran	370	U	390		350		370		360		360	
Diethyl phthalate	370	U	390		350		370		360		360	
Dimethyl phthalate	370	U	390		350		370		360		360	
Fluoranthene	1100		390		600		370		360		360	
Fluorene	38	()	390		350		370		360		360	
Hexachlorobenzene	370	U	390		350		370		360		360	
Hexachlorobutadiene	370	U	390		350		370		360		360	
Hexachlorocyclopentadiene	370	U	390		350		370		360		360	
Hexachloroethane	370	U	390		350		370		360		360	
Indeno(1,2,3-cd)pyrene	330	()	390		400		370		360		360	
Isophorone	370	U	390		350		370		360		360	
N-Nitroso-di-n-propylamine	370	U	390		350		370		360		360	
N-Nitrosodiphenylamine(1)	370	U	390		350		370		360		360	
Naphthalene	370	U	390		350		370		360		360	
Nitrobenzene	370	U	390		350		370		360		360	
Pentachlorophenol	890	U	950		850		900		880		880	
Phenanthrene	390		390		150		370		360		360	
Phenol	370	U	390		350		370		360		360	
Pyrene	1100		390		660		370		360		360	
bis(2-Chloroethoxy)methane	370	U	390		350		370		360		360	
bis(2-Chloroethyl)ether	370	U	390		350		370		360		360	
bis(2-Ethylhexyl)phthalate	370	U	390		350		79	()	360		360	

## Metals by CLP

## Antimony

## Arsenic

**Appendix F: Complete Analytical Database**  
**110th FG, MIANG, Battle Creek, Michigan**

LOCATOR:  
SAMPLE ID:  
COLLECTION DATE:  
ASSOCIATED QC:

1B7 BC1-B7-00-01 1B7 BC1-B7-10-12 1B8 BC1-B8-00-01 1B8 BC1-B8-20-22 1B9 BC1-B9-00-01 1B11 BC1-B11-00-01  
11/09/94 11/09/94 11/09/94 11/07/94 11/09/94 11/10/94  
BC-TB4, BC-ER7 BC-TB4, BC-ER7 BC-TB4, BC-ER6 BC-TB2, BC-ER5 BC-TB4, BC-ER6 BC-TB4, BC-ER6  
BC-FB3, BC-FB6 BC-FB3, BC-FB6 BC-FB3, BC-FB6 BC-FB3, BC-FB6 BC-FB3, BC-FB6 BC-FB3, BC-FB6

	1B7	1B7	1B7	1B8	1B8	1B8	1B9	1B11
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Barium	49.10		16.70		38.80		21.60	37
Beryllium	0.30	U	0.12	U	0.19	U	0.22	0.27
Cadmium	0.03	U	0.04	U	0.03	U	0.03	0.03
Chromium	10.40		14		10.60		8.90	10.70
Chromium, Cr+6	-		-		-		-	-
Copper	7.70		5.60		6.50		8.70	8.50
Lead	13.90		3		101		17.50	19.50
Mercury	-		-		-		-	-
Nickel	9		11.40		8.20		9.10	8.50
Selenium	0.31	UJ	0.33	UJ	0.29	UJ	0.31	0.31
Silver	0.04	U	0.05	U	0.04	U	0.04	1.90
Thallium	0.33	U	0.36	U	0.31	U	0.33	0.33
Zinc	24.10	J	12.40	J	26.10	J	18.20	20.40
								J

**Appendix F: Complete Analytical Database**  
**110th FG, MIANG, Battle Creek, Michigan**

	1B11		1B11		1B11		1B12		1B12		1B15		1B18	
	LOCATOR:	SAMPLE ID:	COLLECTION DATE:	ASSOCIATED QC:	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Volatiles Compounds by 8240														
1,1,1-Trichloroethane	BC1-B11-19-23	11/09/94	BC1-B11-19-23D	11/09/94	6	U	6	U	5	U	6	U	5	U
1,1,2,2-Tetrachloroethane	BC-TB4,BC-ER6	BC-FB3, BC-FB6	BC-TB4,BC-ER6	BC-FB3, BC-FB6	11	U	11	U	10	U	11	U	11	U
1,1,2-Trichloroethane	6	U	6	U	6	U	6	U	5	U	6	U	5	U
1,1-Dichloroethane	6	U	6	U	6	U	6	U	5	U	6	U	5	U
1,1-Dichloroethene	6	U	6	U	6	U	6	U	5	U	6	U	5	U
1,2-Dichloroethane	6	U	6	U	6	U	6	U	5	U	6	U	5	U
1,2-Dichloroethene(Total)	-		-		-		-		-		-		-	
1,2-Dichloropropane	6	U	6	U	6	U	6	U	5	U	6	U	5	U
2-Butanone	22	U	22	U	22	U	23	U	21	U	23	U	22	U
2-Hexanone	17	U	17	U	17	U	17	U	15	U	17	U	16	U
4-Methyl-2-pentanone	17	U	17	U	17	U	17	U	15	U	17	U	16	U
Acetone	8	(B)	8	(B)	8	(B)	41	B	14	B	23	B	17	B
Benzene	6	U	6	U	6	U	6	U	5	U	6	U	5	U
Bromodichloromethane	6	U	6	U	6	U	6	U	5	U	6	U	5	U
Bromoform	11	U	11	U	11	U	11	U	10	U	11	U	11	U
Bromomethane	6	U	6	U	6	U	6	U	5	U	6	U	5	U
Carbon disulfide	6	U	6	U	6	U	6	U	5	U	6	U	5	U
Carbon tetrachloride	6	U	6	U	6	U	6	U	5	U	6	U	5	U
Chlorobenzene	6	U	6	U	6	U	6	U	5	U	6	U	5	U
Chloroethane	11	U	11	U	11	U	11	U	10	U	11	U	11	U
Chloroform	6	U	6	U	6	U	6	U	5	U	6	U	5	U
Chloromethane	11	U	11	U	11	U	11	U	10	U	11	U	11	U
Cis-1,2-Dichloroethene	6	U	6	U	6	U	6	U	5	U	6	U	5	U
Cis-1,3-Dichloropropene	6	U	6	U	6	U	6	U	5	U	6	U	5	U
Dibromochloromethane	6	U	6	U	6	U	6	U	5	U	6	U	5	U
Ethylbenzene	6	U	6	U	6	U	6	U	5	U	6	U	5	U
Methylene chloride	10	(B)	9	(B)	9	(B)	15	B	9	(B)	14	B	12	B
Styrene	6	U	6	U	6	U	6	U	5	U	6	U	5	U
Tetrachloroethene	6	U	6	U	6	U	6	U	5	U	6	U	5	U
Toluene	6	U	6	U	6	U	6	U	5	U	6	U	5	U
Trans-1,2-Dichloroethene	6	U	6	U	6	U	6	U	5	U	6	U	5	U
Trans-1,3-Dichloropropene	6	U	6	U	6	U	6	U	5	U	6	U	5	U
Trichloroethene	6	U	6	U	6	U	6	U	5	U	6	U	5	U
Vinyl acetate	11	U	11	U	11	U	11	U	10	U	11	U	11	U
Vinyl chloride	11	U	11	U	11	U	11	U	10	U	11	U	11	U

**Appendix F: Complete Analytical Database**  
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:  
SAMPLE ID:  
COLLECTION DATE:  
ASSOCIATED QC:

1B11  
BC1-B11-19-23  
11/09/94  
BC-TB4, BC-ER6  
BC-FB3, BC-FB6

1B11  
BC1-B11-19-23D  
11/09/94  
BC-TB4, BC-ER6  
BC-FB3, BC-FB6

1B12  
BC1-B12-00-01  
11/09/94  
BC-TB4, BC-ER6  
BC-FB3, BC-FB6

1B12  
BC1-B12-20-22  
11/07/94  
BC-TB2, BC-ER5  
BC-FB3, BC-FB6

1B15  
BC1-B15-10-12  
11/08/94  
BC-TB3, BC-ER6  
BC-FB3, BC-FB6

1B18  
BC1-B18-15-17  
11/09/94  
BC-TB4, BC-ER7  
BC-FB3, BC-FB6

	1B11	1B11	1B12	1B12	1B15	1B18
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Xylenes (Total)	370	U	370	U	370	U
Semivolatiles Compounds by CLP						
1,2,4-Trichlorobenzene	370	U	370	U	370	U
1,2-Dichlorobenzene	370	U	370	U	370	U
1,3-Dichlorobenzene	370	U	370	U	370	U
1,4-Dichlorobenzene	370	U	370	U	370	U
1-Methylnaphthalene	-		-		-	
2,2'-Oxybis(1-chloropropane)	370	U	370	U	370	U
2,4,5-Trichlorophenol	900	U	900	U	900	U
2,4,6-Trichlorophenol	370	U	370	U	370	U
2,4-Dichlorophenol	370	U	370	U	370	U
2,4-Dimethylphenol	370	U	370	U	370	U
2,4-Dinitrophenol	900	U	900	U	900	U
2,4-Dinitrotoluene	370	U	370	U	370	U
2,6-Dinitrotoluene	370	U	370	U	370	U
2-Chloronaphthalene	370	U	370	U	370	U
2-Chlorophenol	370	U	370	U	370	U
2-Methylnaphthalene	370	U	370	U	370	U
2-Methylphenol	370	U	370	U	370	U
2-Nitroaniline	900	U	900	U	900	U
2-Nitrophenol	370	U	370	U	370	U
3,3'-Dichlorobenzidine	370	U	370	U	370	U
3-Nitroaniline	900	U	900	U	900	U
4,6-Dinitro-2-methylphenol	370	U	370	U	370	U
4-Bromophenyl phenyl ether	370	U	370	U	370	U
4-Chloro-3-methylphenol	370	U	370	U	370	U
4-Chloroaniline	370	U	370	U	370	U
4-Chlorophenyl phenyl ether	370	U	370	U	370	U
4-Methylphenol	370	U	370	U	370	U
4-Nitroaniline	900	U	900	U	900	U
4-Nitrophenol	900	U	900	U	900	U
Acenaphthene	370	U	370	U	370	U
Acenaphthylene	370	U	370	U	370	U
Anthracene	370	U	370	U	370	U
Benzo(a)anthracene	370	U	370	U	370	U

**Appendix F: Complete Analytical Database**  
110th FG, MIANG, Battle Creek, Michigan

	1B11		1B11		1B11		1B12		1B12		1B15		1B18	
	LOCATOR:	SAMPLE ID:	COLLECTION DATE:	ASSOCIATED QC:	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Benzo(a)pyrene	BC1-B11-19-23	11/09/94	BC-TB4, BC-ER6	BC-FB3, BC-FB6	370	U	370	U	380	U	340	U	370	U
Benzo(b)fluoranthene					370	U	370	U	84	U	340	U	370	U
Benzo(g,h,i)perylene					370	U	370	U	380	U	340	U	370	U
Benzo(k)fluoranthene					370	U	370	U	88	U	340	U	370	U
Butyl benzyl phthalate					370	U	370	U	380	U	340	U	370	U
Carbazole					370	U	370	U	380	U	340	U	370	U
Chrysene					370	U	370	U	52	U	340	U	370	U
Di-n-butyl phthalate					56	U	370	U	70	U	340	U	370	U
Di-n-octyl phthalate					370	U	370	U	380	U	340	U	370	U
Dibenzo(a,h)anthracene					370	U	370	U	380	U	340	U	370	U
Dibenzofuran					370	U	370	U	380	U	340	U	370	U
Diethyl phthalate					370	U	370	U	380	U	340	U	370	U
Dimethyl phthalate					370	U	370	U	380	U	340	U	370	U
Fluoranthene					370	U	370	U	58	U	340	U	370	U
Fluorene					370	U	370	U	380	U	340	U	370	U
Hexachlorobenzene					370	U	370	U	380	U	340	U	370	U
Hexachlorobutadiene					370	U	370	U	380	U	340	U	370	U
Hexachlorocyclopentadiene					370	U	370	U	380	U	340	U	370	U
Hexachloroethane					370	U	370	U	380	U	340	U	370	U
Indeno(1,2,3-cd)pyrene					370	U	370	U	380	U	340	U	370	U
Isophorone					370	U	370	U	380	U	340	U	370	U
N-Nitroso-di-n-propylamine					370	U	370	U	380	U	340	U	370	U
N-Nitrosodiphenylamine(1)					370	U	370	U	380	U	340	U	370	U
Naphthalene					370	U	370	U	380	U	340	U	370	U
Nitrobenzene					370	U	370	U	380	U	340	U	370	U
Pentachlorophenol					900	U	900	U	920	U	820	U	900	U
Phenanthrene					370	U	370	U	380	U	340	U	370	U
Phenol					370	U	370	U	380	U	340	U	370	U
Pyrene					370	U	370	U	62	U	340	U	370	U
bis(2-Chloroethoxy)methane					370	U	370	U	380	U	340	U	370	U
bis(2-Chloroethyl)ether					370	U	370	U	380	U	340	U	370	U
bis(2-Ethylhexyl)phthalate					370	U	1100	U	380	U	340	U	370	U
Metals by CLP														
Antimony					0.17	U	0.22	U	0.66	U	0.12	U	0.13	U
Arsenic					2	U	2.20	U	8.10	U	1.80	U	3.50	U
													1.30	U
													16.20	U

**Appendix F: Complete Analytical Database**  
**110th FG, MIANG, Battle Creek, Michigan**

LOCATOR:  
SAMPLE ID:  
COLLECTION DATE:  
ASSOCIATED QC:

1B11  
BC1-B11-19-23  
11/09/94  
BC-TB4, BC-ER6  
BC-FB3, BC-FB6

1B11  
BC1-B11-19-23D  
11/09/94  
BC-TB4, BC-ER6  
BC-FB3, BC-FB6

1B12  
BC1-B12-00-01  
11/09/94  
BC-TB4, BC-ER6  
BC-FB3, BC-FB6

1B12  
BC1-B12-20-22  
11/07/94  
BC-TB2, BC-ER5  
BC-FB3, BC-FB6

1B15  
BC1-B15-10-12  
11/08/94  
BC-TB3, BC-ER6  
BC-FB3, BC-FB6

1B18  
BC1-B18-15-17  
11/09/94  
BC-TB4, BC-ER7  
BC-FB3, BC-FB6

	1B11	1B11	1B12	1B12	1B15	1B18
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Barium	9.10	0	70.60	0	15.80	68.70
Beryllium	0.11	0	0.31	0	0.10	0.11
Cadmium	0.03	U	0.17	U	0.03	0.22
Chromium	4.80		16		5	275
Chromium, Cr+6	-		-		-	-
Copper	7.10		18.60		3.20	23.10
Lead	3.10		3150		3	6.70
Mercury	-		-		-	-
Nickel	9.30		10.90	0	4.20	39.20
Selenium	0.32	UJ	1.50	UJ	0.31	0.30
Silver	0.05	U	0.22	U	0.04	0.06
Thallium	0.34	U	1.70	U	0.33	0.32
Zinc	18.20	J	168	J	12.20	21.20

**Appendix F: Complete Analytical Database**  
**110th FG, MIANG, Battle Creek, Michigan**

LOCATOR: 1B19  
SAMPLE ID: BC1-B19-00-01  
COLLECTION DATE: 11/10/94  
ASSOCIATED QC: BC-TB4, BC-ER7  
BC-FB3, BC-FB6

1MW2  
BC1-MW2-10-12  
12/14/94  
BC-TB1  
BC-FB3, BC-FB6

1MW2  
BC1-MW2-20-22  
12/14/94  
BC-TB1  
BC-FB3, BC-FB6

1SS11  
BC1-SS11  
12/18/94  
BC-TB3  
BC-FB3, BC-FB6

1SS12  
BC1-SS12  
12/18/94  
BC-TB3  
BC-FB3, BC-FB6

	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
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**Volatiles Compounds by 8240**

1,1,1-Trichloroethane	6	U	6	U	5	U	5	U	5	U	-	-
1,1,2,2-Tetrachloroethane	11	U	11	U	11	U	10	U	10	U	-	-
1,1,2-Trichloroethane	6	U	6	U	5	U	5	U	5	U	-	-
1,1-Dichloroethane	6	U	6	U	5	U	5	U	5	U	-	-
1,1-Dichloroethane	6	U	6	U	5	U	5	U	5	U	-	-
1,2-Dichloroethane	6	U	6	U	5	U	5	U	5	U	-	-
1,2-Dichloroethane(Total)	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	6	U	6	U	5	U	5	U	5	U	-	-
2-Butanone	22	U	23	U	22	U	20	U	20	U	-	-
2-Hexanone	17	U	17	U	16	U	15	U	15	U	-	-
4-Methyl-2-pentanone	17	U	17	U	16	U	15	U	15	U	-	-
Acetone	13	B	7	(B)	19	J	10	U	10	U	-	-
Benzene	6	U	6	U	5	U	5	U	5	U	-	-
Bromodichloromethane	6	U	6	U	5	U	5	U	5	U	-	-
Bromoform	11	U	11	U	11	U	10	U	10	U	-	-
Bromomethane	6	U	6	U	5	U	5	U	5	U	-	-
Carbon disulfide	6	U	6	U	5	U	5	U	5	U	-	-
Carbon tetrachloride	6	U	6	U	5	U	5	U	5	U	-	-
Chlorobenzene	6	U	6	U	5	U	5	U	5	U	-	-
Chloroethane	11	U	11	U	11	U	10	U	10	U	-	-
Chloroform	6	U	6	U	5	U	5	U	5	U	-	-
Chloromethane	11	U	11	U	11	U	10	U	10	U	-	-
Cis-1,2-Dichloroethene	6	U	6	U	5	U	5	U	5	U	-	-
Cis-1,3-Dichloropropene	6	U	6	U	5	U	5	U	5	U	-	-
Dibromochloromethane	6	U	6	U	5	U	5	U	5	U	-	-
Ethylbenzene	6	U	6	U	5	U	5	U	5	U	-	-
Methylene chloride	12	B	15	B	21	B	22	B	22	B	-	-
Styrene	6	U	6	U	5	U	5	U	5	U	-	-
Tetrachloroethene	6	U	6	U	5	U	5	U	5	U	-	-
Toluene	6	U	6	U	5	U	5	U	5	U	-	-
Trans-1,2-Dichloroethene	6	U	6	U	5	U	5	U	5	U	-	-
Trans-1,3-Dichloropropene	6	U	6	U	5	U	5	U	5	U	-	-
Trichloroethene	6	U	6	U	5	U	5	U	5	U	-	-
Vinyl acetate	11	U	11	U	11	U	10	U	10	U	-	-
Vinyl chloride	11	U	11	U	11	U	10	U	10	U	-	-

**Appendix F: Complete Analytical Database**  
**110th FG, MIANG, Battle Creek, Michigan**

	LOCATOR:		1B19		1B19		1MW2		1MW2		1MW2		1SS11		1SS12	
	SAMPLE ID:	COLLECTION DATE:	BC1-B19-00-01	11/10/94	BC1-B19-20-22	11/09/94	BC1-MW2-10-12	12/14/94	BC1-MW2-20-22	12/14/94	BC1-MW2-20-22	12/14/94	BC1-SS11	12/18/94	BC1-SS12	12/18/94
	ASSOCIATED QC:		BC-TB4, BC-ER7	BC-FB3, BC-FB6	BC-TB4, BC-ER7	BC-FB3, BC-FB6	BC-TB1	BC-FB3, BC-FB6	BC-TB1	BC-FB3, BC-FB6	BC-TB1	BC-FB3, BC-FB6	BC-TB3	BC-FB3, BC-FB6	BC-TB3	BC-FB3, BC-FB6
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Xylenes (Total)	17	U	17	U	16	U	15	U								
Semivolatiles Compounds by CLP																
1,2,4-Trichlorobenzene	370	U	370	U	350	U	340	U	340	U	730	U	740	U	740	U
1,2-Dichlorobenzene	370	U	370	U	350	U	340	U	340	U	730	U	740	U	740	U
1,3-Dichlorobenzene	370	U	370	U	350	U	340	U	340	U	730	U	740	U	740	U
1,4-Dichlorobenzene	370	U	370	U	350	U	340	U	340	U	730	U	740	U	740	U
1-Methylnaphthalene	-	U	-	U	350	U	340	U	340	U	-	U	-	U	-	U
2,2'-Oxybis(1-chloropropane)	370	U	370	U	350	U	340	U	340	U	730	U	740	U	740	U
2,4,5-Trichlorophenol	900	U	910	U	860	U	810	U	810	U	1800	U	1800	U	1800	U
2,4,6-Trichlorophenol	370	U	370	U	350	U	340	U	340	U	730	U	740	U	740	U
2,4-Dichlorophenol	370	U	370	U	350	U	340	U	340	U	730	U	740	U	740	U
2,4-Dimethylphenol	370	U	370	U	350	U	340	U	340	U	730	U	740	U	740	U
2,4-Dinitrophenol	900	U	910	U	860	U	810	U	810	U	1800	U	1800	U	1800	U
2,6-Dinitrotoluene	370	U	370	U	350	U	340	U	340	U	730	U	740	U	740	U
2-Chloronaphthalene	370	U	370	U	350	U	340	U	340	U	730	U	740	U	740	U
2-Chlorophenol	370	U	370	U	350	U	340	U	340	U	730	U	740	U	740	U
2-Methylnaphthalene	370	U	370	U	350	U	340	U	340	U	730	U	740	U	740	U
2-Methylphenol	370	U	370	U	350	U	340	U	340	U	730	U	740	U	740	U
2-Nitroaniline	900	U	910	U	860	U	810	U	810	U	1800	U	1800	U	1800	U
2-Nitrophenol	370	U	370	U	350	U	340	U	340	U	730	U	740	U	740	U
3,3'-Dichlorobenzidine	370	U	370	U	350	U	340	U	340	U	730	U	740	U	740	U
3-Nitroaniline	900	U	910	U	860	U	810	U	810	U	1800	U	1800	U	1800	U
4,6-Dinitro-2-methylphenol	370	U	370	U	350	U	340	U	340	U	730	U	740	U	740	U
4-Bromophenyl phenyl ether	370	U	370	U	350	U	340	U	340	U	730	U	740	U	740	U
4-Chloro-3-methylphenol	370	U	370	U	350	U	340	U	340	U	730	U	740	U	740	U
4-Chloroaniline	370	U	370	U	350	U	340	U	340	U	730	U	740	U	740	U
4-Chlorophenyl phenyl ether	370	U	370	U	350	U	340	U	340	U	730	U	740	U	740	U
4-Methylphenol	370	U	370	U	350	U	340	U	340	U	730	U	740	U	740	U
4-Nitroaniline	900	U	910	U	860	U	810	U	810	U	1800	U	1800	U	1800	U
4-Nitrophenol	900	U	910	U	860	U	810	U	810	U	1800	U	1800	U	1800	U
Acenaphthene	370	U	370	U	350	U	340	U	340	U	730	U	740	U	740	U
Acenaphthylene	370	U	370	U	350	U	340	U	340	U	730	U	740	U	740	U
Anthracene	370	U	370	U	350	U	340	U	340	U	730	U	740	U	740	U
Benzo(a)anthracene	370	U	370	U	350	U	340	U	340	U	730	U	740	U	740	U



**Appendix F: Complete Analytical Database**  
**110th FG, MIANG, Battle Creek, Michigan**

LOCATOR: SAMPLE ID: COLLECTION DATE: ASSOCIATED QC:	1B19		1B19		1MW2		1MW2		1SS11		1SS12	
	BC1-B19-00-01	BC1-B19-20-22	BC1-B19-20-22	BC1-MW2-10-12	BC1-MW2-20-22	BC1-SS11	BC1-SS12					
	11/10/94	11/09/94	12/14/94	12/14/94	12/14/94	12/18/94	12/18/94					
	BC-TB4,BC-ER7	BC-TB4,BC-ER7	BC-TB1	BC-TB3	BC-TB1	BC-TB3	BC-TB3					
	BC-FB3, BC-FB6	BC-FB3, BC-FB6	BC-FB3, BC-FB6	BC-FB3, BC-FB6	BC-FB3, BC-FB6	BC-FB3, BC-FB6	BC-FB3, BC-FB6					
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL				
Benzo(a)pyrene	370	U	370	U	350	U	340	U	730	U	740	U
Benzo(b)fluoranthene	370	U	370	U	350	U	340	U	730	U	740	U
Benzo(g,h,i)perylene	370	U	370	U	350	U	340	U	730	U	740	U
Benzo(k)fluoranthene	370	U	370	U	350	U	340	U	730	U	740	U
Butyl benzyl phthalate	370	U	370	U	350	U	340	U	730	U	740	U
Carbazole	370	U	370	U	350	U	340	U	730	U	740	U
Chrysene	370	U	370	U	350	U	340	U	730	U	740	U
Di-n-butyl phthalate	54	U	370	U	68	0B	35	0B	730	U	740	U
Di-n-octyl phthalate	370	U	370	U	350	U	340	U	730	U	740	U
Dibenzo(a,h)anthracene	370	U	370	U	350	U	340	U	730	U	740	U
Dibenzofuran	370	U	370	U	350	U	340	U	730	U	740	U
Diethyl phthalate	370	U	370	U	350	U	340	U	730	U	740	U
Dimethyl phthalate	370	U	370	U	350	U	340	U	730	U	740	U
Fluoranthene	370	U	370	U	350	U	340	U	730	U	740	U
Fluorene	370	U	370	U	350	U	340	U	730	U	740	U
Hexachlorobenzene	370	U	370	U	350	U	340	U	730	U	740	U
Hexachlorobutadiene	370	U	370	U	350	U	340	U	730	U	740	U
Hexachlorocyclopentadiene	370	U	370	U	350	U	340	U	730	U	740	U
Hexachloroethane	370	U	370	U	350	U	340	U	730	U	740	U
Indeno(1,2,3-cd)pyrene	370	U	370	U	350	U	340	U	730	U	740	U
Isophorone	370	U	370	U	350	U	340	U	730	U	740	U
N-Nitroso-di-n-propylamine	370	U	370	U	350	U	340	U	730	U	740	U
N-Nitrosodiphenylamine(1)	370	U	370	U	350	U	340	U	730	U	740	U
Naphthalene	370	U	370	U	350	U	340	U	730	U	740	U
Nitrobenzene	370	U	370	U	350	U	340	U	730	U	740	U
Pentachlorophenol	900	U	910	U	860	U	810	U	1800	U	1800	U
Phenanthrene	370	U	370	U	350	U	340	U	730	U	740	U
Phenol	370	U	370	U	350	U	340	U	730	U	740	U
Pyrene	370	U	370	U	350	U	340	U	730	U	740	U
bis(2-Chloroethoxy)methane	370	U	370	U	350	U	340	U	730	U	740	U
bis(2-Chloroethyl)ether	370	U	370	U	350	U	340	U	730	U	740	U
bis(2-Ethylhexyl)phthalate	370	U	83	U	350	U	340	U	730	U	740	U

**Metals by CLP**

Antimony	0.17	(U)	0.14	UJ	0.20	UJ	0.19	UJ	7.10	R	5.90	R
Arsenic	5.70		1.20		3.80		13.90			J		J

Appendix F: Complete Analytical Database  
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:  
SAMPLE ID:  
COLLECTION DATE:  
ASSOCIATED QC:

1B19 BC1-B19-00-01 1B19 BC1-B19-20-22 1MW2 BC1-MW2-10-12 1MW2 BC1-MW2-20-22 1SS11 BC1-SS11 1SS12 BC1-SS12  
11/10/94 11/09/94 12/14/94 12/14/94 12/18/94 12/18/94  
BC-TB4, BC-ER7 BC-TB4, BC-ER7 BC-TB1 BC-TB1 BC-TB3 BC-TB3  
BC-FB3, BC-FB6 BC-FB3, BC-FB6 BC-FB3, BC-FB6 BC-FB3, BC-FB6 BC-FB3, BC-FB6 BC-FB3, BC-FB6

	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Barium	30.20		7.90		10.30		11.40		20.30		33.10	
Beryllium	0.24	U	0.10	U	0.12	U	0.06	U	0.29	U	0.29	U
Cadmium	0.03	U	0.03	U	0.05	U	0.05	U	0.22	U	0.07	U
Chromium	8.80		4.90		5.20		3.40		9.70		12.70	J
Chromium, Cr+6	-		-		-		-		-		-	
Copper	6.50		3.20		4.30		5.20		8.20		9.70	
Lead	7.70		2.20		3.80	J	2.30	J	9.60		6.50	
Mercury	-		-		-		-		0.10	U	0.12	U
Nickel	7.80		12.20		4.80		4.80		8.40		10.80	
Selenium	0.32	UJ	0.32	UJ	0.65		0.73		1.10	J	0.58	J
Silver	0.05	U	0.16	U	0.06	UJ	0.06	UJ	0.49	UJ	0.56	UJ
Thallium	0.34	U	0.34	U	0.57	U	0.55	U	0.33	U	0.34	U
Zinc	17.10	J	10.10	J	15.50		8.50		22.70	J	21.30	J

# Appendix F: Complete Analytical Database 110th FG, MIANG, Battle Creek, Michigan

LOCATOR:  
SAMPLE ID:  
COLLECTION DATE:  
ASSOCIATED QC:

1SS13	1SS14	3B1	3B2	3B3	3SB101
BC1-SS13	BC1-SS14	BC3-B1-04-06	BC3-B2-04-06	BC3-B3-04-06	BC3-SB101
12/18/94	12/18/94	11/08/94	11/08/94	11/08/94	11/05/94
BC-TB3	BC-TB3	BC-TB1,BC-ER3	BC-TB1,BC-ER3	BC-TB1,BC-ER3	BC-TB1,BC-ER3
BC-FB3, BC-FB6	BC-FB3, BC-FB6	BC-FB3, BC-FB6	BC-FB3, BC-FB6	BC-FB3, BC-FB6	BC-FB3, BC-FB6
RESULT QUAL	RESULT QUAL	RESULT QUAL	RESULT QUAL	RESULT QUAL	RESULT QUAL

## Volatiles Compounds by 8240

1,1,1-Trichloroethane	-	-	-	-	-
1,1,2,2-Tetrachloroethane	-	-	-	-	-
1,1,2-Trichloroethane	-	-	-	-	-
1,1-Dichloroethane	-	-	-	-	-
1,1-Dichloroethene	-	-	-	-	-
1,2-Dichloroethane	-	-	-	-	-
1,2-Dichloroethene(Total)	-	-	-	-	-
1,2-Dichloropropane	-	-	-	-	-
2-Butanone	-	-	-	-	-
2-Hexanone	-	-	-	-	-
4-Methyl-2-pentanone	-	-	-	-	-
Acetone	-	-	-	-	-
Benzene	-	-	-	-	-
Bromodichloromethane	-	-	-	-	-
Bromoform	-	-	-	-	-
Bromomethane	-	-	-	-	-
Carbon disulfide	-	-	-	-	-
Carbon tetrachloride	-	-	-	-	-
Chlorobenzene	-	-	-	-	-
Chloroethane	-	-	-	-	-
Chloroform	-	-	-	-	-
Chloromethane	-	-	-	-	-
Cis-1,2-Dichloroethene	-	-	-	-	-
Cis-1,3-Dichloropropene	-	-	-	-	-
Dibromochloromethane	-	-	-	-	-
Ethylbenzene	-	-	-	-	-
Methylene chloride	-	-	-	-	-
Styrene	-	-	-	-	-
Tetrachloroethene	-	-	-	-	-
Toluene	-	-	-	-	-
Trans-1,2-Dichloroethene	-	-	-	-	-
Trans-1,3-Dichloropropene	-	-	-	-	-
Trichloroethene	-	-	-	-	-
Vinyl acetate	-	-	-	-	-
Vinyl chloride	-	-	-	-	-

**Appendix F: Complete Analytical Database**  
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	1SS13	1SS14	3B1	3B2	3B3	3SB101
SAMPLE ID:	BC1-SS13	BC1-SS14	BC3-B1-04-06	BC3-B2-04-06	BC3-B3-04-06	BC3-SB101
COLLECTION DATE:	12/18/94	12/18/94	11/08/94	11/08/94	11/08/94	11/05/94
ASSOCIATED QC:	BC-TB3	BC-TB3	BC-TB1,BC-ER3	BC-TB1,BC-ER3	BC-TB1,BC-ER3	BC-TB1,BC-ER3
	BC-FB3, BC-FB6	BC-FB3, BC-FB6	BC-FB3, BC-FB6	BC-FB3, BC-FB6	BC-FB3, BC-FB6	BC-FB3, BC-FB6

	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Xylenes (Total)	-		-		-		-		-	
Semivolatiles Compounds by CLP										
1,2,4-Trichlorobenzene	760	U	720	U	-		-		-	
1,2-Dichlorobenzene	760	U	720	U	-		-		-	
1,3-Dichlorobenzene	760	U	720	U	-		-		-	
1,4-Dichlorobenzene	760	U	720	U	-		-		-	
1-Methylnaphthalene	-		-		-		-		-	
2,2'-Oxybis(1-chloropropane)	760	U	720	U	-		-		-	
2,4,5-Trichlorophenol	1800	U	1700	U	-		-		-	
2,4,6-Trichlorophenol	760	U	720	U	-		-		-	
2,4-Dichlorophenol	760	U	720	U	-		-		-	
2,4-Dimethylphenol	760	U	720	U	-		-		-	
2,4-Dinitrophenol	1800	U	1700	U	-		-		-	
2,4-Dinitrotoluene	760	U	720	U	-		-		-	
2,6-Dinitrotoluene	760	U	720	U	-		-		-	
2-Chloronaphthalene	760	U	720	U	-		-		-	
2-Chlorophenol	760	U	720	U	-		-		-	
2-Methylnaphthalene	760	U	720	U	-		-		-	
2-Nitrophenol	1800	U	1700	U	-		-		-	
2-Nitroaniline	760	U	720	U	-		-		-	
3,3'-Dichlorobenzidine	760	U	720	U	-		-		-	
3-Nitroaniline	1800	U	1700	U	-		-		-	
4,6-Dinitro-2-methylphenol	1800	U	1700	U	-		-		-	
4-Bromophenyl phenyl ether	760	U	720	U	-		-		-	
4-Chloro-3-methylphenol	760	U	720	U	-		-		-	
4-Chloroaniline	760	U	720	U	-		-		-	
4-Chlorophenyl phenyl ether	760	U	720	U	-		-		-	
4-Methylphenol	760	U	720	U	-		-		-	
4-Nitroaniline	1800	U	1700	U	-		-		-	
4-Nitrophenol	1800	U	1700	U	-		-		-	
Acenaphthene	760	U	720	U	-		-		-	
Acenaphthylene	760	U	720	U	-		-		-	
Anthracene	760	U	720	U	-		-		-	
Benzo(a)anthracene	760	U	720	U	-		-		-	

**Appendix F: Complete Analytical Database**  
**110th FG, MIANG, Battle Creek, Michigan**

LOCATOR:  
SAMPLE ID:  
COLLECTION DATE:  
ASSOCIATED QC:

1SS13  
BC1-SS13  
12/18/94  
BC-TB3  
BC-FB3, BC-FB6

1SS14  
BC1-SS14  
12/18/94  
BC-TB3  
BC-FB3, BC-FB6

3B1  
BC3-B1-04-06  
11/08/94  
BC-TB1,BC-ER3  
BC-FB3, BC-FB6

3B2  
BC3-B2-04-06  
11/08/94  
BC-TB1,BC-ER3  
BC-FB3, BC-FB6

3B3  
BC3-B3-04-06  
11/08/94  
BC-TB1,BC-ER3  
BC-FB3, BC-FB6

3SB101  
BC3-SB101  
11/05/94  
BC-TB1,BC-ER3  
BC-FB3, BC-FB6

	1SS13	1SS14	3B1	3B2	3B3	3SB101
	BC1-SS13	BC1-SS14	BC3-B1-04-06	BC3-B2-04-06	BC3-B3-04-06	BC3-SB101
	12/18/94	12/18/94	11/08/94	11/08/94	11/08/94	11/05/94
	BC-TB3	BC-TB3	BC-TB1,BC-ER3	BC-TB1,BC-ER3	BC-TB1,BC-ER3	BC-TB1,BC-ER3
	BC-FB3, BC-FB6	BC-FB3, BC-FB6	BC-FB3, BC-FB6	BC-FB3, BC-FB6	BC-FB3, BC-FB6	BC-FB3, BC-FB6
RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT
QUAL		QUAL		QUAL		QUAL
Benzo(a)pyrene	760	U	720	U	-	-
Benzo(b)fluoranthene	760	U	720	U	-	-
Benzo(g,h,i)perylene	760	U	720	U	-	-
Benzo(k)fluoranthene	760	U	720	U	-	-
Butyl benzyl phthalate	760	U	720	U	-	-
Carbazole	760	U	720	U	-	-
Chrysene	760	U	720	U	-	-
Di-n-butyl phthalate	760	U	100	U	-	-
Di-n-octyl phthalate	760	U	720	U	-	-
Dibenzo(a,h)anthracene	760	U	720	U	-	-
Dibenzofuran	760	U	720	U	-	-
Diethyl phthalate	760	U	720	U	-	-
Dimethyl phthalate	760	U	720	U	-	-
Fluoranthene	760	U	720	U	-	-
Fluorene	760	U	720	U	-	-
Hexachlorobenzene	760	U	720	U	-	-
Hexachlorobutadiene	760	U	720	U	-	-
Hexachlorocyclopentadiene	760	U	720	U	-	-
Hexachloroethane	760	U	720	U	-	-
Indeno(1,2,3-cd)pyrene	760	U	720	U	-	-
Isophorone	760	U	720	U	-	-
N-Nitroso-di-n-propylamine	760	U	720	U	-	-
N-Nitrosodiphenylamine(1)	760	U	720	U	-	-
Naphthalene	760	U	720	U	-	-
Nitrobenzene	760	U	720	U	-	-
Pentachlorophenol	1800	U	1700	U	-	-
Phenanthrene	760	U	720	U	-	-
Phenol	760	U	720	U	-	-
Pyrene	760	U	720	U	-	-
bis(2-Chloroethoxy)methane	760	U	720	U	-	-
bis(2-Chloroethyl)ether	760	U	720	U	-	-
bis(2-Ethylhexyl)phthalate	760	U	720	U	-	-
Metals by CLP						
Antimony	8.50	R	4.80	R	0.21	0.14
Arsenic		J	5.60	J	UJ	0J
					5	3

**Appendix F: Complete Analytical Database**  
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:  
SAMPLE ID:  
COLLECTION DATE:  
ASSOCIATED QC:

1SS13  
BC1-SS13  
12/18/94  
BC-TB3  
BC-FB3, BC-FB6

1SS14  
BC1-SS14  
12/18/94  
BC-TB3  
BC-FB3, BC-FB6

3B1  
BC3-B1-04-06  
11/08/94  
BC-TB1, BC-ER3  
BC-FB3, BC-FB6

3B2  
BC3-B2-04-06  
11/08/94  
BC-TB1, BC-ER3  
BC-FB3, BC-FB6

3B3  
BC3-B3-04-06  
11/08/94  
BC-TB1, BC-ER3  
BC-FB3, BC-FB6

3SB101  
BC3-SB101  
11/05/94  
BC-TB1, BC-ER3  
BC-FB3, BC-FB6

	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Barium	35.70		17.70	()			6.40	()			10.30	()
Beryllium	0.40	()	0.16	()			0.10	()			0.13	()
Cadmium	0.07	()	0.05	U			0.16	()			0.08	()
Chromium	16.80	J	6.20				5.20	J			5.60	J
Chromium, Cr+6	-		-				-				-	
Copper	12.50		5.70				5.70				5	20.30
Lead	8.40		10.30				5.20				5.90	356
Mercury	0.10	U	0.10	U			0.20	U			0.20	U
Nickel	13.70		6				5.80				4.80	
Selenium	0.60	J	0.50	UJ			3.40	UJ			3.40	UJ
Silver	0.60	UJ	0.51	UJ			0.50	U			0.09	()
Thallium	0.31	()	0.32	U			3	U			3	0.32
Zinc	24.40	J	13.70	J			11.70				11.50	62.30

**Appendix F: Complete Analytical Database**  
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	3SB201	3SB201	3SB301	BSB1	BSB1	BSB2
SAMPLE ID:	BC3-SB201	BC3-SB201	BC3-SB301	BCB-B1-0002	BCB-B1-2527	BCB-B2-0002
COLLECTION DATE:	11/05/94	11/05/94	11/05/94	07/13/94	07/13/94	07/13/94
ASSOCIATED QC:	BC-TB1, BC-ER3 BC-FB3, BC-FB6	BC-TB1, BC-ER3 BC-FB3, BC-FB6	BC-TB1, BC-ER3 BC-FB3, BC-FB6			
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL

Volatiles Compounds by 8240

1,1,1-Trichloroethane	-	-	-	11	U	11	U
1,1,2,2-Tetrachloroethane	-	-	-	11	U	11	U
1,1,2-Trichloroethane	-	-	-	11	U	11	U
1,1-Dichloroethane	-	-	-	11	U	11	U
1,1-Dichloroethene	-	-	-	11	U	11	U
1,2-Dichloroethane	-	-	-	11	U	11	U
1,2-Dichloroethene(Total)	-	-	-	11	U	11	U
1,2-Dichloropropane	-	-	-	11	U	11	U
2-Butanone	-	-	-	11	U	11	U
2-Hexanone	-	-	-	11	U	11	U
4-Methyl-2-pentanone	-	-	-	11	U	11	U
Acetone	-	-	-	11	U	11	U
Benzene	-	-	-	29	B	37	B
Bromodichloromethane	-	-	-	11	U	11	U
Bromoform	-	-	-	11	U	11	U
Bromomethane	-	-	-	11	U	11	U
Carbon disulfide	-	-	-	11	U	11	U
Carbon tetrachloride	-	-	-	11	U	11	U
Chlorobenzene	-	-	-	11	U	11	U
Chloroethane	-	-	-	11	U	11	U
Chloroform	-	-	-	11	U	11	U
Chloromethane	-	-	-	11	U	11	U
Cis-1,2-Dichloroethene	-	-	-	-	-	-	-
Cis-1,3-Dichloropropene	-	-	-	11	U	11	U
Dibromochloromethane	-	-	-	11	U	11	U
Ethylbenzene	-	-	-	10	JB	14	B
Methylene chloride	-	-	-	11	U	11	U
Styrene	-	-	-	11	U	1	J
Tetrachloroethene	-	-	-	11	U	11	U
Toluene	-	-	-	11	U	11	U
Trans-1,2-Dichloroethene	-	-	-	-	-	-	-
Trans-1,3-Dichloropropene	-	-	-	11	U	11	U
Trichloroethene	-	-	-	11	U	11	U
Vinyl acetate	-	-	-	-	-	-	-
Vinyl chloride	-	-	-	11	U	11	U

**Appendix F: Complete Analytical Database**  
**110th FG, MIANG, Battle Creek, Michigan**

LOCATOR: SAMPLE ID: COLLECTION DATE: ASSOCIATED QC:	3SB201 BC3-SB201 11/05/94 BC-TB1,BC-ER3 BC-FB3, BC-FB6		3SB201 BC3-SB201 11/05/94 BC-TB1,BC-ER3 BC-FB3, BC-FB6		3SB301 BC3-SB301 11/05/94 BC-TB1,BC-ER3 BC-FB3, BC-FB6		BSB1 BCB-B1-0002 07/13/94		BSB1 BCB-B1-2527 07/13/94		BSB2 BCB-B2-0002 07/13/94	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Xylenes (Total)	-		-		-		11		11		11	
Semivolatiles Compounds by CLP												
1,2,4-Trichlorobenzene	-		-		-		360		340		350	
1,2-Dichlorobenzene	-		-		-		360		340		350	
1,3-Dichlorobenzene	-		-		-		360		340		350	
1,4-Dichlorobenzene	-		-		-		360		340		350	
1-Methylnaphthalene	-		-		-		-		-		-	
2,2'-Oxybis(1-chloropropane)	-		-		-		360		340		350	
2,4,5-Trichlorophenol	-		-		-		870		830		840	
2,4,6-Trichlorophenol	-		-		-		360		340		350	
2,4-Dichlorophenol	-		-		-		360		340		350	
2,4-Dimethylphenol	-		-		-		360		340		350	
2,4-Dinitrophenol	-		-		-		870		830		840	
2,4-Dinitrotoluene	-		-		-		360		340		350	
2,6-Dinitrotoluene	-		-		-		360		340		350	
2-Chloronaphthalene	-		-		-		360		340		350	
2-Chlorophenol	-		-		-		360		340		350	
2-Methylnaphthalene	-		-		-		360		340		350	
2-Methylphenol	-		-		-		360		340		350	
2-Nitroaniline	-		-		-		870		830		840	
2-Nitrophenol	-		-		-		360		340		350	
3,3'-Dichlorobenzidine	-		-		-		360		340		350	
3-Nitroaniline	-		-		-		870		830		840	
4,6-Dinitro-2-methylphenol	-		-		-		870		830		840	
4-Bromophenyl phenyl ether	-		-		-		360		340		350	
4-Chloro-3-methylphenol	-		-		-		360		340		350	
4-Chloroaniline	-		-		-		360		340		350	
4-Chlorophenyl phenyl ether	-		-		-		360		340		350	
4-Methylphenol	-		-		-		360		340		350	
4-Nitroaniline	-		-		-		360		340		350	
4-Nitrophenol	-		-		-		870		830		840	
Acenaphthene	-		-		-		870		830		840	
Acenaphthylene	-		-		-		360		340		350	
Anthracene	-		-		-		82		340		70	
Benzo(a)anthracene	-		-		-		680		340		310	



**Appendix F: Complete Analytical Database**  
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:  
SAMPLE ID:  
COLLECTION DATE:  
ASSOCIATED QC:

BSB2  
BCB-B2-0002  
07/13/94

BSB1  
BCB-B1-2527  
07/13/94

BSB1  
BCB-B1-0002  
07/13/94

3SB301  
BC3-SB301  
11/05/94  
BC-TB1,BC-ER3  
BC-FB3, BC-FB6

3SB201  
BC3-SB201  
11/05/94  
BC-TB1,BC-ER3  
BC-FB3, BC-FB6

3SB201  
BC3-SB201  
11/05/94  
BC-TB1,BC-ER3  
BC-FB3, BC-FB6

	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Benzo(a)pyrene	-		-		-		760		340		210	J
Benzo(b)fluoranthene	-		-		-		1300	X	340	U	440	X
Benzo(g,h,i)perylene	-		-		-		300	J	340	U	120	J
Benzo(k)fluoranthene	-		-		-		1800	X	340	U	600	X
Butyl benzyl phthalate	-		-		-		360	U	340	U	350	U
Carbazole	-		-		-		65	J	340	U	350	U
Chrysene	-		-		-		850		340	U	260	J
Di-n-butyl phthalate	-		-		-		45	J	45	J	350	U
Di-n-octyl phthalate	-		-		-		360	U	340	U	350	U
Dibenzo(a,h)anthracene	-		-		-		130	J	340	U	30	J
Dibenzofuran	-		-		-		360	U	340	U	350	U
Diethyl phthalate	-		-		-		360	U	340	U	350	U
Dimethyl phthalate	-		-		-		360	U	340	U	350	U
Fluoranthene	-		-		-		1200	U	340	U	410	U
Fluorene	-		-		-		44	J	340	U	350	U
Hexachlorobenzene	-		-		-		360	U	340	U	350	U
Hexachlorobutadiene	-		-		-		360	U	340	U	350	U
Hexachlorocyclopentadiene	-		-		-		360	U	340	U	350	U
Hexachloroethane	-		-		-		360	U	340	U	350	U
Indeno(1,2,3-cd)pyrene	-		-		-		540	U	340	U	160	J
Isophorone	-		-		-		360	U	340	U	350	U
N-Nitroso-di-n-propylamine	-		-		-		360	U	340	U	350	U
N-Nitrosodiphenylamine(1)	-		-		-		360	U	340	U	350	U
Naphthalene	-		-		-		360	U	340	U	350	U
Nitrobenzene	-		-		-		360	U	340	U	350	U
Pentachlorophenol	-		-		-		870	U	830	U	840	U
Phenanthrene	-		-		-		650	U	340	U	210	J
Phenol	-		-		-		360	U	340	U	350	U
Pyrene	-		-		-		930	U	340	U	330	J
bis(2-Chloroethoxy)methane	-		-		-		360	U	340	U	350	U
bis(2-Chloroethyl)ether	-		-		-		360	U	340	U	350	U
bis(2-Ethylhexyl)phthalate	-		-		-		230	J	340	U	160	J
Metals by CLP	0.36	0J	0.36	0J	0.72	0J	3.30	UN	3.20	UN	3.20	UN
Antimony	3.70		3.70		5.90		7.60	AN	2	N	3	AN
Arsenic												

**Appendix F: Complete Analytical Database**  
**110th FG, MIANG, Battle Creek, Michigan**

LOCATOR:  
SAMPLE ID:  
COLLECTION DATE:  
ASSOCIATED QC:

3SB201  
BC3-SB201  
11/05/94  
BC-TB1,BC-ER3  
BC-FB3, BC-FB6

3SB201  
BC3-SB201  
11/05/94  
BC-TB1,BC-ER3  
BC-FB3, BC-FB6

3SB301  
BC3-SB301  
11/05/94  
BC-TB1,BC-ER3  
BC-FB3, BC-FB6

BSB1  
BCB-B1-0002  
07/13/94

BSB1  
BCB-B1-2527  
07/13/94

BSB2  
BCB-B2-0002  
07/13/94

	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Barium	22.50	()	22.50	()	102		0.21	B	0.12	U	0.16	B
Beryllium	0.12	()	0.12	()	0.18		0.37	UN	0.36	UN	2.70	N
Cadmium	2.20		2.20		8.60		9.90	N	3.30	N	58.10	N
Chromium	27.40	J	27.40	J	61.90	J	0	U	0	U	0.02	
Chromium, Cr+6	-		-		-		12.40		2.50	B	24.60	
Copper	19.40		19.40		42.20		36.30		2.20	A*	200	
Lead	244	U	244	U	609		0.11	U	0.10	U	0.11	U
Mercury	0.10		0.10		0.11		8.90		4.20	U	4.30	U
Nickel	7.20		7.20		8.60		0.43	UN	0.41	UWN	0.42	UWN
Selenium	0.36	UJ	0.36	UJ	0.37	UJ	0.44	U	0.42	U	0.43	U
Silver	0.09	()	0.09	()	0.17		0.39	U	0.38	U	0.38	U
Thallium	0.32	U	0.32	U	0.33		41.20	EN	12.80	EN	112	EN
Zinc	649		649		217							

# Appendix F: Complete Analytical Database 110th FG, MIANG, Battle Creek, Michigan

LOCATOR: BSB2  
SAMPLE ID: BCB-B2-2022  
COLLECTION DATE: 07/13/94  
ASSOCIATED QC:

BSB4  
BCB-B4-1012  
07/13/94

BSB4  
BCB-B4-0507  
07/13/94

BSB4  
BCB-B4-0002  
07/13/94

BSB3  
BCB-B3-1011  
07/13/94

BSB3  
BCB-B3-0002  
07/13/94

	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Volatiles Compounds by 8240												
1,1,1-Trichloroethane	10	U	10	U	10	U	10	U	10	U	10	U
1,1,2,2-Tetrachloroethane	10	U	10	U	10	U	10	U	10	U	10	U
1,1,2-Trichloroethane	10	U	10	U	10	U	10	U	10	U	10	U
1,1-Dichloroethane	10	U	10	U	10	U	10	U	10	U	10	U
1,1-Dichloroethene	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichloroethane	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichloroethene(Total)	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichloropropane	10	U	10	U	10	U	10	U	10	U	10	U
2-Butanone	10	U	10	U	10	U	10	U	10	U	10	U
2-Hexanone	10	U	10	U	10	U	10	U	10	U	10	U
4-Methyl-2-pentanone	10	U	10	U	10	U	10	U	10	U	10	U
Acetone	27	B	25	B	25	B	23	B	24	B	21	B
Benzene	10	U	10	U	10	U	10	U	10	U	10	U
Bromodichloromethane	10	U	10	U	10	U	10	U	10	U	10	U
Bromoform	10	U	10	U	10	U	10	U	10	U	10	U
Bromomethane	10	U	10	U	10	U	10	U	10	U	10	U
Carbon disulfide	10	U	10	U	10	U	10	U	10	U	10	U
Carbon tetrachloride	10	U	10	U	10	U	10	U	10	U	10	U
Chlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U
Chloroethane	10	U	10	U	10	U	10	U	10	U	10	U
Chloroform	10	U	10	U	10	U	10	U	10	U	10	U
Chloromethane	10	U	10	U	10	U	10	U	10	U	10	U
Cis-1,2-Dichloroethene	-	U	-	U	-	U	-	U	-	U	-	U
Cis-1,3-Dichloropropene	10	U	10	U	10	U	10	U	10	U	10	U
Dibromochloromethane	10	U	10	U	10	U	10	U	10	U	10	U
Ethylbenzene	7	JB	51	B	7	JB	9	JB	0	(B)	9	JB
Methylene chloride	10	U	10	U	10	U	10	U	10	U	10	U
Styrene	10	U	10	U	10	U	10	U	10	U	10	U
Tetrachloroethene	10	U	10	U	10	U	10	U	10	U	10	U
Toluene	10	U	10	U	10	U	10	U	10	U	10	U
Trans-1,2-Dichloroethene	-	U	-	U	-	U	-	U	-	U	-	U
Trans-1,3-Dichloropropene	10	U	10	U	10	U	10	U	10	U	10	U
Trichloroethene	10	U	10	U	10	U	10	U	10	U	10	U
Vinyl acetate	-	U	-	U	-	U	-	U	-	U	-	U
Vinyl chloride	10	U	10	U	10	U	10	U	10	U	10	U

# Appendix F: Complete Analytical Database 110th FG, MIANG, Battle Creek, Michigan

LOCATOR:  
SAMPLE ID:  
COLLECTION DATE:  
ASSOCIATED QC:

BSB2  
BCB-B2-2022  
07/13/94

BSB3  
BCB-B3-0002  
07/13/94

BSB3  
BCB-B3-1011  
07/13/94

BSB4  
BCB-B4-0002  
07/13/94

BSB4  
BCB-B4-0507  
07/13/94

BSB4  
BCB-B4-1012  
07/13/94

	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Xylenes (Total)	10	U	10	U	10	U	10	U	10	U	10	U
Semivolatiles Compounds by CLP												
1,2,4-Trichlorobenzene	340	U	340	U	340	U	340	U	340	U	340	U
1,2-Dichlorobenzene	340	U	340	U	340	U	340	U	340	U	340	U
1,3-Dichlorobenzene	340	U	340	U	340	U	340	U	340	U	340	U
1,4-Dichlorobenzene	340	U	340	U	340	U	340	U	340	U	340	U
1-Methylnaphthalene	-	U	-	U	-	U	-	U	-	U	-	U
2,2'-Oxybis(1-chloropropane)	340	U	340	U	340	U	340	U	340	U	340	U
2,4,5-Trichlorophenol	820	U	830	U	820	U	820	U	810	U	820	U
2,4,6-Trichlorophenol	340	U	340	U	340	U	340	U	340	U	340	U
2,4-Dichlorophenol	340	U	340	U	340	U	340	U	340	U	340	U
2,4-Dimethylphenol	340	U	340	U	340	U	340	U	340	U	340	U
2,4-Dinitrophenol	820	U	830	U	820	U	820	U	810	U	820	U
2,4-Dinitrotoluene	340	U	340	U	340	U	340	U	340	U	340	U
2,6-Dinitrotoluene	340	U	340	U	340	U	340	U	340	U	340	U
2-Chloronaphthalene	340	U	340	U	340	U	340	U	340	U	340	U
2-Chlorophenol	340	U	340	U	340	U	340	U	340	U	340	U
2-Methylnaphthalene	340	U	340	U	340	U	340	U	340	U	340	U
2-Methylphenol	340	U	340	U	340	U	340	U	340	U	340	U
2-Nitroaniline	820	U	830	U	820	U	820	U	810	U	820	U
2-Nitrophenol	340	U	340	U	340	U	340	U	340	U	340	U
3,3'-Dichlorobenzidine	340	U	340	U	340	U	340	U	340	U	340	U
3-Nitroaniline	820	U	830	U	820	U	820	U	810	U	820	U
4,6-Dinitro-2-methylphenol	820	U	830	U	820	U	820	U	810	U	820	U
4-Bromophenyl phenyl ether	340	U	340	U	340	U	340	U	340	U	340	U
4-Chloro-3-methylphenol	340	U	340	U	340	U	340	U	340	U	340	U
4-Chloroaniline	340	U	340	U	340	U	340	U	340	U	340	U
4-Chlorophenyl phenyl ether	340	U	340	U	340	U	340	U	340	U	340	U
4-Methylphenol	340	U	340	U	340	U	340	U	340	U	340	U
4-Nitroaniline	820	U	830	U	820	U	820	U	810	U	820	U
4-Nitrophenol	820	U	830	U	820	U	820	U	810	U	820	U
Acenaphthene	340	U	340	U	340	U	340	U	340	U	340	U
Acenaphthylene	340	U	340	U	340	U	340	U	340	U	340	U
Anthracene	340	U	49	J	340	U	340	U	340	U	340	U
Benzo(a)anthracene	340	U	490	J	340	U	55	J	340	U	340	U

LOCATOR: BSB2  
SAMPLE ID: BCB-B2-2022  
COLLECTION DATE: 07/13/94  
ASSOCIATED QC:

BSB4  
BCB-B4-1012  
07/13/94

BSB4  
CB-B4-0507  
07/13/94

BSB4  
CB-B4-0002  
07/13/94

	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Benzo(a)pyrene	340	U	520		340	U	56	J	340	U	340	U
Benzo(b)fluoranthene	340	U	1000	X	340	U	100	XJ	340	U	340	U
Benzo(g,h,i)perylene	340	U	100	J	340	U	340		340	U	340	U
Benzo(k)fluoranthene	340	U	1400	X	340	U	140	XJ	340	U	340	U
Butyl benzyl phthalate	340	U	340	U	340	U	340	U	340	U	340	U
Carbazole	340	U	340	U	340	U	340	U	340	U	340	U
Chrysene	340	U	590	U	340	U	74	J	340	U	340	U
Di-n-butyl phthalate	48	J	340	U	340	U	340	U	340	U	140	J
Di-n-octyl phthalate	340	U	340	U	340	U	340	U	340	U	340	U
Dibenzo(a,h)anthracene	340	U	85	J	340	U	340	U	340	U	340	U
Dibenzofuran	340	U	340	U	340	U	340	U	340	U	340	U
Diethyl phthalate	340	U	340	U	340	U	340	U	340	U	340	U
Dimethyl phthalate	340	U	340	U	340	U	340	U	340	U	340	U
Fluoranthene	340	U	850	U	340	U	340	U	340	U	340	U
Fluorene	340	U	340	U	340	U	140	J	340	U	340	U
Hexachlorobenzene	340	U	340	U	340	U	340	U	340	U	340	U
Hexachlorobutadiene	340	U	340	U	340	U	340	U	340	U	340	U
Hexachlorocyclopentadiene	340	U	340	U	340	U	340	U	340	U	340	U
Hexachloroethane	340	U	340	U	340	U	340	U	340	U	340	U
Indeno(1,2,3-cd)pyrene	340	U	220	J	340	U	340	U	340	U	340	U
Isophorone	340	U	340	U	340	U	340	U	340	U	340	U
N-Nitroso-di-n-propylamine	340	U	340	U	340	U	340	U	340	U	340	U
N-Nitrosodiphenylamine(1)	340	U	340	U	340	U	340	U	340	U	340	U
Naphthalene	340	U	340	U	340	U	340	U	340	U	340	U
Nitrobenzene	340	U	340	U	340	U	340	U	340	U	340	U
Pentachlorophenol	820	U	830	U	820	U	820	U	810	U	820	U
Phenanthrene	340	U	330	J	340	U	80	J	340	U	340	U
Phenol	340	U	340	U	340	U	340	U	340	U	340	U
Pyrene	340	U	650	U	340	U	100	J	340	U	340	U
bis(2-Chloroethoxy)methane	340	U	340	U	340	U	340	U	340	U	340	U
bis(2-Chloroethyl)ether	340	U	340	U	340	U	340	U	340	U	340	U
bis(2-Ethylhexyl)phthalate	340		340	U	340	U	340	U	340	U	375	J
Metals by CLP												
Antimony	3.50	N	3.10	UN	4.70	N	3.20	N	3.80	L	3.10	U
Arsenic	5.30	N	8.70	N	8.50	N	11.40	N	12.70	L	1.90	N

Metals by CLP

## Antimony

## Arsenic

**Appendix F: Complete Analytical Database**  
**110th FG, MIANG, Battle Creek, Michigan**

LOCATOR:  
SAMPLE ID:  
COLLECTION DATE:  
ASSOCIATED QC:

BSB2  
BCB-B2-2022  
07/13/94

BSB3  
BCB-B3-0002  
07/13/94

BSB3  
BCB-B3-1011  
07/13/94

BSB4  
BCB-B4-0002  
07/13/94

BSB4  
BCB-B4-0507  
07/13/94

BSB4  
BCB-B4-1012  
07/13/94

	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Barium	-		0.12	B	0.22	B	0.22	B	0.11	U	0.13	()
Beryllium	0.35	UN	0.35	U	0.35	U	0.35	UN	0.35	UN	0.35	UL
Cadmium	8.50	N	6.80	N	8.20	N	8.20	N	7.30	N	8	L
Chromium	0	U	0	U	0	U	0	U	0	U	0	U
Chromium, Cr+6	6.40		6.10		6.80		6.80		7.30		4.40	
Copper	3.40	*	13.70	*	6.50	*	6.50	*	16.20	*	4.50	
Lead	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
Mercury	15.10		9		10.90		10.90		10.30		6.90	
Nickel	0.40	UWN	0.41	UWN	0.40	UWN	0.40	UWN	0.40	UWN	0.40	UL
Selenium	0.41	U	0.42	U	0.41	U	0.41	U	0.41	U	0.41	U
Silver	0.37	UW	0.38	U	0.37	UW	0.37	UW	0.37	U	0.37	U
Thallium	17.80	EN	25	EN	18.40	EN	18.40	EN	36.50	EN	29.90	L
Zinc											11.25	EN

Appendix F: Complete Analytical Database  
110th FG, MIANG, Battle Creek, Michigan

LOCATOR: BCB4  
SAMPLE ID: BCB-B4-1012D  
COLLECTION DATE: 07/13/94  
ASSOCIATED QC:

	RESULT	QUAL
Volatiles Compounds by 8240		
1,1,1-Trichloroethane	11	U
1,1,2,2-Tetrachloroethane	11	U
1,1,2-Trichloroethane	11	U
1,1-Dichloroethane	11	U
1,1-Dichloroethane	11	U
1,2-Dichloroethane	11	U
1,2-Dichloroethane(Total)	11	U
1,2-Dichloropropane	11	U
2-Butanone	11	U
2-Hexanone	11	U
4-Methyl-2-pentanone	11	U
Acetone	44	B
Benzene	11	U
Bromodichloromethane	11	U
Bromoform	11	U
Bromomethane	11	U
Carbon disulfide	11	U
Carbon tetrachloride	11	U
Chlorobenzene	11	U
Chloroethane	11	U
Chloroform	11	U
Chloromethane	11	U
Cis-1,2-Dichloroethene	-	
Cis-1,3-Dichloropropene	11	U
Dibromochloromethane	11	U
Ethylbenzene	11	U
Methylene chloride	10	JB
Styrene	11	U
Tetrachloroethene	11	U
Toluene	11	U
Trans-1,2-Dichloroethene	-	
Trans-1,3-Dichloropropene	11	U
Trichloroethene	11	U
Vinyl acetate	-	
Vinyl chloride	11	U

# Appendix F: Complete Analytical Database 110th FG, MIANG, Battle Creek, Michigan

LOCATOR: BCB4  
SAMPLE ID: BCB-B4-1012D  
COLLECTION DATE: 07/13/94  
ASSOCIATED QC:

	RESULT	QUAL
Xylenes (Total)	11	U
Semivolatiles Compounds by CLP		
1,2,4-Trichlorobenzene	380	U
1,2-Dichlorobenzene	380	U
1,3-Dichlorobenzene	380	U
1,4-Dichlorobenzene	380	U
1-Methylnaphthalene	-	
2,2'-Oxybis(1-chloropropane)	380	U
2,4,5-Trichlorophenol	910	U
2,4,6-Trichlorophenol	380	U
2,4-Dichlorophenol	380	U
2,4-Dimethylphenol	380	U
2,4-Dinitrophenol	910	U
2,4-Dinitrotoluene	380	U
2,6-Dinitrotoluene	380	U
2-Chloronaphthalene	380	U
2-Chlorophenol	380	U
2-Methylnaphthalene	380	U
2-Methylphenol	380	U
2-Nitroaniline	910	U
2-Nitrophenol	380	U
3,3'-Dichlorobenzidine	380	U
3-Nitroaniline	910	U
4,6-Dinitro-2-methylphenol	910	U
4-Bromophenyl phenyl ether	380	U
4-Chloro-3-methylphenol	380	U
4-Chloroaniline	380	U
4-Chlorophenyl phenyl ether	380	U
4-Methylphenol	380	U
4-Nitroaniline	910	U
4-Nitrophenol	910	U
Acenaphthene	380	U
Acenaphthylene	380	U
Anthracene	380	U
Benzo(a)anthracene	380	U



# Appendix F: Complete Analytical Database 110th FG, MIANG, Battle Creek, Michigan

LOCATOR: BCB4  
SAMPLE ID: BCB-B4-1012D  
COLLECTION DATE: 07/13/94  
ASSOCIATED QC:

	RESULT	QUAL
Benzo(a)pyrene	380	U
Benzo(b)fluoranthene	380	U
Benzo(g,h,i)perylene	380	U
Benzo(k)fluoranthene	380	U
Butyl benzyl phthalate	380	U
Carbazole	380	U
Chrysene	380	U
Di-n-butyl phthalate	140	J
Di-n-octyl phthalate	380	U
Dibenzo(a,h)anthracene	380	U
Dibenzofuran	380	U
Diethyl phthalate	380	U
Dimethyl phthalate	380	U
Fluoranthene	380	U
Fluorene	380	U
Hexachlorobenzene	380	U
Hexachlorobutadiene	380	U
Hexachlorocyclopentadiene	380	U
Hexachloroethane	380	U
Indeno(1,2,3-cd)pyrene	380	U
Isophorone	380	U
N-Nitroso-di-n-propylamine	380	U
N-Nitrosodiphenylamine(1)	380	U
Naphthalene	380	U
Nitrobenzene	380	U
Pentachlorophenol	910	U
Phenanthrene	380	U
Phenol	380	U
Pyrene	380	U
bis(2-Chloroethoxy)methane	380	U
bis(2-Chloroethyl)ether	380	U
bis(2-Ethylhexyl)phthalate	600	U
Metals by CLP		
Antimony	3.50	U*
Arsenic	1.70	N

# Appendix F: Complete Analytical Database 110th FG, MIANG, Battle Creek, Michigan

LOCATOR: BCB4  
SAMPLE ID: BCB-B4-1012D  
COLLECTION DATE: 07/13/94  
ASSOCIATED QC:

RESULT QUAL

Barium	0.13	U
Beryllium	0.39	U
Cadmium	4.70	*
Chromium	0	U
Chromium, Cr+6	2.80	B
Copper	2.10	N
Lead	0.15	
Mercury	13.50	*
Nickel	0.45	UWN
Selenium	0.46	U
Silver	0.41	U
Thallium	9.10	E
Zinc		

# Appendix F: Complete Analytical Database 110th FG, MIANG, Battle Creek, Michigan

LOCATOR: BCMW1 BCMW2 BCMW3 BCMW4 BCMW5  
SAMPLE ID: BC-MW1-GW4 BC-MW2-GW4 BC-MW3-GW4 BC-MW4-GW4 BC-MW5-GW4  
COLLECTION DATE: 05/19/94 05/19/94 05/20/94 05/23/94 05/23/94  
ASSOCIATED QC: BC-TB1, BC-FB2, BC-FB3 BC-TB1, BC-FB2, BC-FB3 BC-ER1 BC-TB5, BC-ER3 BC-TB2, BC-FB1 BC-TB5, BC-ER1 BC-FB1, BC-FB2, BC-FB3

	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Halogenated Volatiles Compounds by 8010										
1,1,1,2-Tetrachloroethane	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,1,1-Trichloroethane	0.35	U	0.03		0.07		0.52		0.20	B
1,1,2,2-Tetrachloroethane	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U
1,1,2-Trichloroethane	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
1,1-Dichloroethane	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,1-Dichloroethene	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,2,3-Trichloropropane	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,2-Dibromoethane (Ethylene di	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,2-Dichlorobenzene	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
1,2-Dichloroethane	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
1,2-Dichloropropane	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
1,3-Dichlorobenzene	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
1,4-Dichlorobenzene	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
2-Chloroethyl vinyl ether	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U
2-Chlorotoluene	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
4-Chlorotoluene	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
Bromobenzene	0.85	U	0.85	U	0.85	U	0.85	U	0.85	U
Bromochloromethane	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
Bromodichloromethane	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U
Bromoform	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Bromomethane	0.45	U	0.45	U	0.45	U	0.45	U	0.45	U
Carbon tetrachloride	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
Chlorobenzene	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
Chloroethane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chloroform	0.35	U	0.07	B	0.05	B	0.35	U	0.35	U
Chloromethane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Cis-1,3-Dichloropropene	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
Dibromochloromethane	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
Dibromomethane	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U
Methylene chloride	0.12	B	0.38	B	0.30	B	0.24	B	0.03	(B)
Tetrachloroethene	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
Trans-1,2-Dichloroethene	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
Trans-1,3-Dichloropropene	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
Trichloroethene	0.30	U	0.30	U	0.70	U	2.10	B	1.90	U
Vinyl chloride	0.55	U	0.55	U	0.55	U	0.55	U	0.55	U

# Appendix F: Complete Analytical Database 110th FG, MIANG, Battle Creek, Michigan

LOCATOR:  
SAMPLE ID:  
COLLECTION DATE:  
ASSOCIATED QC:

BCMWW1  
BC-MW1-GW4  
05/19/94  
BC-TB1,BC-ER1  
BC-FB1, BC-FB2, BC-FB3

BCMWW2  
BC-MW2-GW4  
05/19/94  
BC-TB1,BC-ER1  
BC-FB1, BC-FB2, BC-FB3

BCMWW3  
BC-MW3-GW4  
05/20/94  
BC-ER1

BCMWW4  
BC-MW4-GW4  
05/23/94  
BC-TB5,BC-ER3  
BC-FB1, BC-FB2, BC-FB3

BCMWW4  
BC-MW4-GW5  
12/17/94  
BC-TB2,  
BC-FB1

BCMWW5  
BC-MW5-GW4  
05/23/94  
BC-TB5,BC-ER1  
BC-FB1, BC-FB2, BC-FB3

	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
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## Aromatic Volatiles Compounds by 8020

1,2-Dichlorobenzene	0.15	U	0.15	U	0.15	U	0.06	B	0.15	U	0.15	U
1,3-Dichlorobenzene	0.20	U	0.20	U	0.20	U	0.04	B	0.20	U	0.20	U
1,4-Dichlorobenzene	0.15	U	0.15	U	0.15	U	0.05	B	0.15	U	0.15	U
Benzene	0.35	U	0.35	U	0.35	U	0.06	B	0.35	U	0.06	B
Chlorobenzene	0.25	U	0.25	U	0.25	U	0.04	U	0.25	U	0.25	U
Ethylbenzene	0.02	U	0.20	U	0.20	U	0.20	U	0.20	U	0.06	B
Methyl-tert-butyl ether	0.10	U	5	U	5	U	0.22	U	5	U	5	U
Styrene	0.25	U	0.25	U	0.25	U	0.04	B	0.25	U	0.25	U
Toluene	0.25	U	0.25	U	0.25	U	0.11	B	0.25	U	0.03	B
m + p-Xylene	-	U	0.50	U	0.50	U	-	U	0.50	U	-	U
m-Xylene	0.02	B	-	U	-	U	0.05	B	-	U	0.04	B
o-Xylene	0.20	U	0.20	U	0.20	U	0.05	B	0.20	U	0.20	U
p-Xylene	0.01	B	-	U	-	U	0.25	U	-	U	0.25	U

## Semivolatiles Compounds by CLP

1,2,4-Trichlorobenzene	10	U	10	U	10	U	10	U	5	U	10	U
1,2-Dichlorobenzene	10	U	10	U	10	U	10	U	-	U	10	U
1,3-Dichlorobenzene	10	U	10	U	10	U	10	U	-	U	10	U
1,4-Dichlorobenzene	10	U	10	U	10	U	10	U	-	U	10	U
2,2'-Oxybis(1-chloropropane)	-	U	-	U	-	U	-	U	5	U	-	U
2,4,5-Trichlorophenol	20	U	20	U	20	U	20	U	20	U	20	U
2,4,6-Trichlorophenol	20	U	20	U	20	U	20	U	5	U	20	U
2,4-Dichlorophenol	10	U	10	U	10	U	10	U	5	U	10	U
2,4-Dimethylphenol	10	U	10	U	10	U	10	U	5	U	10	U
2,4-Dinitrophenol	40	U	40	U	40	U	40	U	20	U	40	U
2,4-Dinitrotoluene	10	U	10	U	10	U	10	U	5	U	10	U
2,6-Dinitrotoluene	10	U	10	U	10	U	10	U	5	U	10	U
2-Chloronaphthalene	10	U	10	U	10	U	10	U	5	U	10	U
2-Chlorophenol	10	U	10	U	10	U	10	U	5	U	10	U
2-Methylnaphthalene	10	U	10	U	10	U	10	U	5	U	10	U
2-Methylphenol	10	U	10	U	10	U	10	U	5	U	10	U
2-Nitroaniline	10	U	10	U	10	U	10	U	20	U	10	U
2-Nitrophenol	10	U	10	U	10	U	10	U	5	U	10	U

# Appendix F: Complete Analytical Database 110th FG, MIANG, Battle Creek, Michigan

	LOCATOR:			BCM1			BCM2			BCM3			BCM4			BCM4			BCM5		
	SAMPLE ID:			BC-MW1-GW4			BC-MW2-GW4			BC-MW3-GW4			BC-MW4-GW4			BC-MW4-GW5			BC-MW5-GW4		
	COLLECTION DATE:			05/19/94			05/19/94			05/20/94			05/23/94			12/17/94			05/23/94		
	ASSOCIATED QC:			BC-TB1, BC-ER1			BC-TB1, BC-ER1			BC-ER1			BC-TB5, BC-ER3			BC-TB2, BC-FB1			BC-TB5, BC-ER1		
	BC-FB1, BC-FB2, BC-FB3			RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
3,3'-Dichlorobenzidine	10	U	10	10	U	10	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U
3-Nitroaniline	20	U	20	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
4,6-Dinitro-2-methylphenol	30	U	30	30	U	30	U	30	U	30	U	30	U	30	U	20	U	30	U	30	U
4-Bromophenyl phenyl ether	10	U	10	10	U	10	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U
4-Chloro-3-methylphenol	10	U	10	10	U	10	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U
4-Chloroaniline	10	U	10	10	U	10	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U
4-Chlorophenyl phenyl ether	10	U	10	10	U	10	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U
4-Methylphenol	10	U	10	10	U	10	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U
4-Nitroaniline	10	U	10	10	U	10	U	10	U	10	U	10	U	10	U	20	U	10	U	10	U
4-Nitrophenol	10	U	10	10	U	10	U	10	U	10	U	10	U	10	U	20	U	10	U	10	U
Acenaphthene	10	U	10	10	U	10	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U
Acenaphthylene	10	U	10	10	U	10	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U
Anthracene	10	U	10	10	U	10	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U
Benzo(a)anthracene	10	U	10	10	U	10	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U
Benzo(a)pyrene	10	U	10	10	U	10	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U
Benzo(b)fluoranthene	10	U	10	10	U	10	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U
Benzo(g,h,i)perylene	10	U	10	10	U	10	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U
Benzo(k)fluoranthene	10	U	10	10	U	10	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U
Benzoic acid	100	U	100	100	U	100	U	100	U	100	U	100	U	100	U	-	U	100	U	100	U
Benzyl alcohol	10	U	10	10	U	10	U	10	U	10	U	10	U	10	U	-	U	10	U	10	U
Butyl benzyl phthalate	10	U	10	10	U	10	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U
Chrysene	10	U	10	10	U	10	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U
Di-n-butyl phthalate	2	B	2	2	B	2	B	2	B	2	B	2	B	2	B	5	U	2	B	2	B
Di-n-octyl phthalate	10	U	10	10	U	10	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U
Dibenzo(a,h)anthracene	10	U	10	10	U	10	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U
Dibenzofuran	10	U	10	10	U	10	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U
Diethyl phthalate	10	U	10	10	U	10	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U
Dimethyl phthalate	10	U	10	10	U	10	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U
Fluoranthene	10	U	10	10	U	10	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U
Fluorene	10	U	10	10	U	10	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U
Hexachlorobenzene	10	U	10	10	U	10	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U
Hexachlorobutadiene	10	U	10	10	U	10	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U
Hexachlorocyclopentadiene	10	U	10	10	U	10	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U
Hexachloroethane	10	U	10	10	U	10	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U
Indeno(1,2,3-cd)pyrene	10	U	10	10	U	10	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U
Isophorone	10	U	10	10	U	10	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U

# Appendix F: Complete Analytical Database 110th FG, MIANG, Battle Creek, Michigan

LOCATOR:  
SAMPLE ID:  
COLLECTION DATE:  
ASSOCIATED QC:

BCM1  
BCM1-GW4  
05/19/94  
BC-TB1, BC-ER1  
BC-FB1, BC-FB2, BC-FB3

BCM2  
BCM2-GW4  
05/19/94  
BC-TB1, BC-ER1  
BC-FB1, BC-FB2, BC-FB3

BCM3  
BCM3-GW4  
05/20/94  
BC-ER1

BCM4  
BCM4-GW4  
05/23/94  
BC-TB5, BC-ER3  
BC-FB1, BC-FB2, BC-FB3

BCM4  
BCM4-GW5  
12/17/94  
BC-TB2,  
BC-FB1

BCM5  
BCM5-GW4  
05/23/94  
BC-TB5, BC-ER1  
BC-FB1, BC-FB2, BC-FB3

	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
N-Nitroso-di-n-propylamine	10	U	10	U	10	U	10	U	10	U	10	U	10	U
N-Nitrosodiphenylamine(1)	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Naphthalene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Nitrobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Pentachlorophenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Phenanthrene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Phenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Pyrene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
bis(2-Chloroethoxy)methane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
bis(2-Chloroethyl)ether	20	U	20	U	20	U	20	U	20	U	20	U	20	U
bis(2-Chloroisopropyl)ether	10	U	10	U	10	U	10	U	10	U	10	U	10	U
bis(2-Ethylhexyl)phthalate	10	U	1	B	4	B	4	B	4	B	5	U	8	B
Metals by CLP														
Aluminum	62.20	U	62.20	U	62.20	U	62.20	U	62.20	U	62.20	U	122	U
Antimony	55.30	U	55.30	U	55.30	U	55.30	U	55.30	U	55.30	U	33.30	U
Arsenic	2.60	UJ	2.60	U	2.60	U	2.60	U	2.60	U	2.60	U	9.30	U
Barium	24.10	U	28.80	U	45.20	U	45.20	U	52.40	U	46.60	U	93.70	U
Beryllium	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U	0.10	U	0.70	U
Cadmium	4.50	UJ	4.50	UJ	4.50	UJ	4.50	UJ	4.50	UJ	0.50	U	4.70	U
Calcium	97400		78600		88800		88800		109000		104000		107000	
Chromium	6	U	6	U	6	U	6	U	6	U	2.20	U	6.60	U
Cobalt	9	U	9	U	9	U	9	U	9	U	0.50	U	6.30	U
Copper	1.50	U	2.40	U	4.40	U	4.40	U	5.10	U	4.70	U	10.60	U
Iron	32.80	U	24.40	U	24.40	U	24.40	U	24.40	U	27.20	U	364	U
Lead	1.80	U	1.80	U	1.80	U	1.80	U	1.80	U	1.60	U	1.80	U
Magnesium	19900		18600		20900		20900		25300		24000		23700	
Manganese	1.20	U	1.20	U	1.20	U	1.20	U	2.40	U	5.70	U	42.40	U
Mercury	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
Nickel	16.60	U	16.60	U	16.60	U	16.60	U	16.60	U	1.50	U	38.80	U
Potassium	714	U	931	U	3990	U	3990	U	5350	U	4770	U	2309.30	U
Selenium	3.40	UJ	3.40	UJ	3.40	UJ	3.40	UJ	3.40	UJ	4.40	U	3.40	U
Silver	3.40	U	3.40	U	3.40	U	3.40	U	3.40	U	4.50	U	5.90	U
Sodium	3420	U	3590	U	29600	U	29600	U	66500	U	26300	U	67100	U
Thallium	2.60	U	2.60	UJ	2.60	UJ	2.60	UJ	3.30	U	2.70	UJ	2.60	UJ
Vanadium	3.50	U	3.50	U	3.50	U	3.50	U	3.50	U	0.50	U	5.30	U

**Appendix F: Complete Analytical Database**  
**110th FG, MIANG, Battle Creek, Michigan**

LOCATOR: BCMW1  
SAMPLE ID: BC-MW1-GW4  
COLLECTION DATE: 05/19/94  
ASSOCIATED QC: BC-TB1,BC-ER1  
BC-FB1, BC-FB2, BC-FB3

LOCATOR: BCMW2  
SAMPLE ID: BC-MW2-GW4  
COLLECTION DATE: 05/19/94  
ASSOCIATED QC: BC-TB1,BC-ER1  
BC-FB1, BC-FB2, BC-FB3

LOCATOR: BCMW3  
SAMPLE ID: BC-MW3-GW4  
COLLECTION DATE: 05/20/94  
ASSOCIATED QC: BC-ER1

LOCATOR: BCMW4  
SAMPLE ID: BC-MW4-GW4  
COLLECTION DATE: 05/23/94  
ASSOCIATED QC: BC-TB5,BC-ER3  
BC-FB1, BC-FB2, BC-FB3

LOCATOR: BCMW4  
SAMPLE ID: BC-MW4-GW5  
COLLECTION DATE: 12/17/94  
ASSOCIATED QC: BC-TB2,  
BC-FB1

LOCATOR: BCMW5  
SAMPLE ID: BC-MW5-GW4  
COLLECTION DATE: 05/23/94  
ASSOCIATED QC: BC-TB5,BC-ER1  
BC-FB1, BC-FB2, BC-FB3

	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Zinc	4.70	()B	6.50	()B	12	()B	11.20	()B	2.50	()	11.40	()				
Water Parameters by EPA 600/4-79-020																
Chloride	10	B	7.23	B	71.40		152		-		159					
Sulfate	32.50	B	16.70	B	22.40		33.90		-		28.80	B				
Dissolved Solids	354		301		437		636		-		608					

# Appendix F: Complete Analytical Database 110th FG, MIANG, Battle Creek, Michigan

LOCATOR: BCMW6 BCMW7 BCMW8 BCMW9 BCMW11  
SAMPLE ID: BC-MW6-GW4 BC-MW7-GW4 BC-MW8-GW4 BC-MW9-GW4 BC-MW11-GW4  
COLLECTION DATE: 05/22/94 05/24/94 05/24/94 05/23/94 05/23/94  
ASSOCIATED QC: BC-TB5, BC-ER1 BC-TB6, BC-ER3 BC-TB6, BC-ER3 BC-TB5, BC-ER3 BC-TB4, BC-ER1  
BC-FB1, BC-FB2, BC-FB3 BC-FB1, BC-FB2, BC-FB3 BC-FB1, BC-FB2, BC-FB3 BC-FB1, BC-FB2, BC-FB3 BC-FB1, BC-FB2, BC-FB3

	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Halogenated Volatiles Compounds by 8010										
1,1,1,2-Tetrachloroethane	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,1,1-Trichloroethane	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,1,2,2-Tetrachloroethane	0.35	U	0.40	U	0.40	U	0.40	U	0.40	U
1,1,2-Trichloroethane	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
1,1-Dichloroethane	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,1-Dichloroethene	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,2,3-Trichloropropane	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,2-Dibromoethane (Ethylene di	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,2-Dichlorobenzene	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
1,2-Dichloroethane	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
1,2-Dichloropropane	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
1,3-Dichlorobenzene	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
1,4-Dichlorobenzene	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
2-Chloroethyl vinyl ether	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U
2-Chlorotoluene	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
4-Chlorotoluene	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
Bromobenzene	0.85	U	0.85	U	0.85	U	0.85	U	0.85	U
Bromochloromethane	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
Bromodichloromethane	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U
Bromoform	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Bromomethane	0.45	U	0.45	U	0.45	U	0.45	U	0.45	U
Carbon tetrachloride	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
Chlorobenzene	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
Chloroethane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chloroform	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
Chloromethane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Cis-1,3-Dichloropropene	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
Dibromochloromethane	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
Dibromomethane	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U
Methylene chloride	0.51	B	0.38	B	0.34	B	0.54	B	0.42	B
Tetrachloroethene	0.11	B	0.30	U	0.30	U	0.30	U	0.30	U
Trans-1,2-Dichloroethene	0.30	U	0.15	U	0.30	U	0.30	U	0.30	U
Trans-1,3-Dichloropropene	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
Trichloroethene	0.50	U	3.60	U	0.30	U	0.30	U	0.30	U
Vinyl chloride	0.55	U	0.55	U	0.55	U	0.55	U	0.55	U



# Appendix F: Complete Analytical Database 110th FG, MIANG, Battle Creek, Michigan

LOCATOR:  
SAMPLE ID:  
COLLECTION DATE:  
ASSOCIATED QC:

BCMW6  
BC-MW6-GW4  
05/22/94  
BC-TB5, BC-ER1  
BC-FB1, BC-FB2, BC-FB3

BCMW7  
BC-MW7-GW4  
05/24/94  
BC-TB6, BC-ER3  
BC-FB1, BC-FB2, BC-FB3

BCMW8  
BC-MW8-GW4  
05/24/94  
BC-TB6, BC-ER3  
BC-FB1, BC-FB2, BC-FB3

BCMW9  
BC-MW9-GW4  
05/23/94  
BC-TB5, BC-ER3  
BC-FB1, BC-FB2, BC-FB3

BCMW9  
BC-MW9-GW4D  
05/23/94  
BC-TB5, BC-ER3  
BC-FB1, BC-FB2, BC-FB3

BCMW11  
BC-MW11-GW4  
05/23/94  
BC-TB4, BC-ER1  
BC-FB1, BC-FB2, BC-FB3

	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
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## Aromatic Volatiles Compounds by 8020

1,2-Dichlorobenzene	0.15	U	0.15	U	0.03	B	0.15	U	0.05	B	0.15	U
1,3-Dichlorobenzene	0.20	U	0.20	U	0.12	B	0.20	U	0.20	U	0.20	U
1,4-Dichlorobenzene	0.15	U	0.15	U	0.05	B	0.15	U	0.15	U	0.04	B
Benzene	0.35	U	0.03	B	0.35	U	0.05	B	0.35	U	0.35	U
Chlorobenzene	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
Ethylbenzene	0.20	U	0.20	U	0.08	B	0.06	B	0.20	U	0.20	U
Methyl-tert-butyl ether	5	U	5	U	5	U	5	U	5	U	5	U
Styrene	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
Toluene	0.09	B	0.10	B	0.25	U	0.45	U	0.25	U	0.13	B
m + p-Xylene	0.50	U	0.50	U	-	U	-	U	0.50	U	0.50	U
m-Xylene	-	U	-	U	0.12	B	0.07	B	-	U	-	U
o-Xylene	0.20	U	0.20	U	0.06	B	0.20	U	0.20	U	0.20	U
p-Xylene	-	U	-	U	0.06	B	0.03	B	-	U	-	U

## Semivolatiles Compounds by CLP

1,2,4-Trichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U
1,3-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U
1,4-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U
2,2'-Oxybis(1-chloropropane)	-	U	-	U	-	U	-	U	-	U	-	U
2,4,5-Trichlorophenol	20	U	20	U	20	U	20	U	20	U	20	U
2,4,6-Trichlorophenol	20	U	20	U	20	U	20	U	20	U	20	U
2,4-Dichlorophenol	10	U	10	U	10	U	10	U	10	U	10	U
2,4-Dimethylphenol	10	U	10	U	10	U	10	U	10	U	10	U
2,4-Dinitrophenol	40	U	40	U	40	U	40	U	40	U	40	U
2,6-Dinitrophenol	10	U	10	U	10	U	10	U	10	U	10	U
2,6-Dinitrotoluene	10	U	10	U	10	U	10	U	10	U	10	U
2-Chloronaphthalene	10	U	10	U	10	U	10	U	10	U	10	U
2-Chlorophenol	10	U	10	U	10	U	10	U	10	U	10	U
2-Methylnaphthalene	10	U	10	U	10	U	10	U	10	U	10	U
2-Methylphenol	10	U	10	U	10	U	10	U	10	U	10	U
2-Nitroaniline	10	U	10	U	10	U	10	U	10	U	10	U
2-Nitrophenol	10	U	10	U	10	U	10	U	10	U	10	U

**Appendix F: Complete Analytical Database**  
**110th FG, MIANG, Battle Creek, Michigan**

LOCATOR: SAMPLE ID: COLLECTION DATE: ASSOCIATED QC:	BCM6		BCM7		BCM8		BCM9		BCM9		BCM11	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
3,3'-Dichlorobenzidine	10	U	10	U	10	U	10	U	10	U	10	U
3-Nitroaniline	20	U	20	U	20	U	20	U	20	U	20	U
4,6-Dinitro-2-methylphenol	30	U	30	U	30	U	30	U	30	U	30	R
4-Bromophenyl phenyl ether	10	U	10	U	10	U	10	U	10	U	10	U
4-Chloro-3-methylphenol	10	U	10	U	10	U	10	U	10	U	10	R
4-Chloroaniline	10	U	10	U	10	U	10	U	10	U	10	U
4-Chlorophenyl phenyl ether	10	U	10	U	10	U	10	U	10	U	10	U
4-Methylphenol	10	U	10	U	10	U	10	U	10	U	10	R
4-Nitroaniline	10	U	10	U	10	U	10	U	10	U	10	R
4-Nitrophenol	10	U	10	U	10	U	10	U	10	U	10	U
Acenaphthene	10	U	10	U	10	U	10	U	10	U	10	U
Acenaphthylene	10	U	10	U	10	U	10	U	10	U	10	U
Anthracene	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(a)anthracene	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(a)pyrene	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(b)fluoranthene	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(g,h,i)perylene	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(k)fluoranthene	10	U	10	U	10	U	10	U	10	U	10	U
Benzoic acid	100	U	100	U	100	U	100	U	100	U	100	U
Benzyl alcohol	10	U	10	U	10	U	10	U	10	U	10	U
Butyl benzyl phthalate	10	U	10	U	10	U	10	U	10	U	10	U
Chrysene	10	U	10	U	10	U	10	U	10	U	10	U
Di-n-butyl phthalate	2	B	10	U	10	U	10	U	2	B	1	U
Di-n-octyl phthalate	10	U	10	U	10	U	10	U	10	U	10	U
Dibenzo(a,h)anthracene	10	U	10	U	10	U	10	U	10	U	10	U
Dibenzofuran	10	U	10	U	10	U	10	U	10	U	10	U
Diethyl phthalate	10	U	10	U	10	U	10	U	10	U	10	U
Dimethyl phthalate	10	U	10	U	10	U	10	U	10	U	10	U
Fluoranthene	10	U	10	U	10	U	10	U	10	U	10	U
Fluorene	10	U	10	U	10	U	10	U	10	U	10	U
Hexachlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U
Hexachlorobutadiene	10	U	10	U	10	U	10	U	10	U	10	U
Hexachlorocyclopentadiene	10	U	10	U	10	U	10	U	10	U	10	U
Hexachloroethane	10	U	10	U	10	U	10	U	10	U	10	U
Indeno(1,2,3-cd)pyrene	10	U	10	U	10	U	10	U	10	U	10	U
Isophorone	10	U	10	U	10	U	10	U	10	U	10	U

# Appendix F: Complete Analytical Database 110th FG, MIANG, Battle Creek, Michigan

LOCATOR: SAMPLE ID: COLLECTION DATE: ASSOCIATED QC:	BCMWW6		BCMWW7		BCMWW8		BCMWW9		BCMWW9		BCMWW11	
	BC-MW6-GW4		BC-MW7-GW4		BC-MW8-GW4		BC-MW9-GW4		BC-MW9-GW4D		BC-MW11-GW4	
	05/22/94		05/24/94		05/24/94		05/23/94		05/23/94		05/23/94	
	BC-TB5,BC-ER1 BC-FB1, BC-FB2, BC-FB3	BC-TB6,BC-ER3 BC-FB1, BC-FB2, BC-FB3	BC-TB6,BC-ER3 BC-FB1, BC-FB2, BC-FB3	BC-TB6,BC-ER3 BC-FB1, BC-FB2, BC-FB3	BC-TB6,BC-ER3 BC-FB1, BC-FB2, BC-FB3	BC-TB6,BC-ER3 BC-FB1, BC-FB2, BC-FB3	BC-TB5,BC-ER3 BC-FB1, BC-FB2, BC-FB3	BC-TB5,BC-ER3 BC-FB1, BC-FB2, BC-FB3	BC-TB5,BC-ER3 BC-FB1, BC-FB2, BC-FB3	BC-TB5,BC-ER3 BC-FB1, BC-FB2, BC-FB3	BC-TB4,BC-ER1 BC-FB1, BC-FB2, BC-FB3	BC-TB4,BC-ER1 BC-FB1, BC-FB2, BC-FB3
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
N-Nitroso-di-n-propylamine	10	U	10	U	10	U	10	U	10	U	10	U
N-Nitrosodiphenylamine(1)	10	U	10	U	10	U	10	U	10	U	10	U
Naphthalene	10	U	10	U	10	U	10	U	10	U	10	U
Nitrobenzene	10	U	10	U	10	U	10	U	10	U	10	U
Pentachlorophenol	20	U	20	U	20	U	20	U	20	U	20	U
Phenanthrene	10	U	10	U	10	U	10	U	10	U	10	U
Phenol	10	U	10	U	10	U	10	U	10	U	10	U
Pyrene	10	U	10	U	10	U	10	U	10	U	10	U
bis(2-Chloroethoxy)methane	10	U	10	U	10	U	10	U	10	U	10	U
bis(2-Chloroethyl)ether	20	U	20	U	20	U	20	U	20	U	20	U
bis(2-Chloroisopropyl)ether	10	U	10	U	10	U	10	U	10	U	10	U
bis(2-Ethylhexyl)phthalate	3	B	1		2		1	B	3	B	2	J
Metals by CLP												
Aluminum	139	U	137	U	156	U	188	U	62.20	U	62.20	U
Antimony	33.30	U	33.30	U	33.30	U	33.30	U	55.30	U	55.30	U
Arsenic	3.40	U	2.60	U	2.60	U	2.60	U	2.60	U	2.60	U
Barium	34.20	U	27.60	U	24.90	U	26.30	U	22.40	U	22.40	U
Beryllium	0.70	U	0.70	U	0.70	U	0.70	U	0.36	U	0.30	U
Cadmium	4.70	U	4.70	U	4.70	U	4.70	U	4.50	U	4.50	U
Calcium	80700	U	72900	U	78000	U	68200	U	67600	U	47300	U
Chromium	6.60	U	6.60	U	6.60	U	6.60	U	6	U	6	U
Cobalt	6.30	U	6.30	U	6.30	U	6.30	U	9	U	9	U
Copper	10.60	U	10.60	U	10.60	U	10.60	U	1.50	U	1.70	U
Iron	45.30	U	94.50	U	191	U	634	U	546	U	24.40	U
Lead	1.80	U	1.80	U	1.80	U	2	U	1.80	U	5	U
Magnesium	20500	U	16900	U	19500	U	16600	U	16000	U	8440	U
Manganese	17.50	U	6.30	U	6.30	U	167	U	164	U	2770	U
Mercury	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
Nickel	38.80	U	38.80	U	38.80	U	38.80	U	16.60	U	16.60	U
Potassium	2309.30	U	2309.30	U	2309.30	U	2309.30	U	714	U	1840	U
Selenium	3.40	U	3.40	U	3.40	U	3.40	U	3.40	U	3.40	U
Silver	5.90	U	5.90	U	5.90	U	5.90	U	3.40	U	3.40	U
Sodium	26000	U	2750	U	4650	U	3100	U	2620	U	2040	U
Thallium	2.60	U	2.60	U	2.60	U	2.60	U	5.60	U	2.80	U
Vanadium	5.30	U	5.30	U	5.30	U	5.30	U	3.50	U	3.50	U

**Appendix F: Complete Analytical Database**  
**110th FG, MIANG, Battle Creek, Michigan**

LOCATOR: BCMW6 BCMW7 BCMW8 BCMW9 BCMW9 BCMW11  
SAMPLE ID: BC-MW6-GW4 BC-MW7-GW4 BC-MW8-GW4 BC-MW9-GW4 BC-MW9-GW4D BC-MW11-GW4  
COLLECTION DATE: 05/22/94 05/24/94 05/24/94 05/23/94 05/23/94 05/23/94  
ASSOCIATED QC: BC-TB5, BC-ER1 BC-TB6, BC-ER3 BC-TB6, BC-ER3 BC-TB5, BC-ER3 BC-TB5, BC-ER3 BC-TB4, BC-ER1  
BC-FB1, BC-FB2, BC-FB3 BC-FB1, BC-FB2, BC-FB3 BC-FB1, BC-FB2, BC-FB3 BC-FB1, BC-FB2, BC-FB3 BC-FB1, BC-FB2, BC-FB3 BC-FB1, BC-FB2, BC-FB3

	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Zinc	5.70	()	8	()	20.60		10.30	()	15.80	()B	16.80	()B
Water Parameters by EPA 600/4-79-020												
Chloride	58.10		5.86	B	9.16	B	-		3.31	B	0	
Sulfate	8.56		22.50	B	29.80	B	-		15.20	B	8.19	B
Dissolved Solids	387		295		326		-		263		172	

# Appendix F: Complete Analytical Database 110th FG, MIANG, Battle Creek, Michigan

LOCATOR: SAMPLE ID: COLLECTION DATE: ASSOCIATED QC:	BCMW12		BCMW13		BCMW13		BCMW14		BCMW15		BCMW16	
	BC-MW12-GW4	05/23/94	BC-ER1	BC-MW13-GW4	05/20/94	BC-MW13-GW4D	05/22/94	BC-MW14-GW4	05/24/94	BC-MW15-GW4	12/18/94	
	BC-TB4, BC-ER1		BC-ER1	BC-ER1	BC-ER1	BC-TB5, BC-ER1	BC-TB6, BC-ER3	BC-FB1, BC-FB2, BC-FB3	BC-FB1, BC-FB2, BC-FB3	BC-TB2	BC-FB1	
	BC-FB1, BC-FB2, BC-FB3											
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Halogenated Volatiles Compounds by 8010												
1,1,1,2-Tetrachloroethane	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,1,1-Trichloroethane	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,1,2,2-Tetrachloroethane	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U
1,1,2-Trichloroethane	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
1,1-Dichloroethane	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,1-Dichloroethene	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,2,3-Trichloropropane	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,2-Dibromoethane (Ethylene di	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,2-Dichlorobenzene	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
1,2-Dichloroethane	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
1,2-Dichloropropane	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
1,3-Dichlorobenzene	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
1,4-Dichlorobenzene	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
2-Chloroethyl vinyl ether	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U
2-Chlorotoluene	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
4-Chlorotoluene	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
Bromobenzene	0.85	U	0.85	U	0.85	U	0.85	U	0.85	U	0.85	U
Bromochloromethane	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
Bromodichloromethane	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U
Bromoform	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Bromomethane	0.45	U	0.45	U	0.45	U	0.45	U	0.45	U	0.45	U
Carbon tetrachloride	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
Chlorobenzene	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
Chloroethane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chloroform	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
Chloromethane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Cis-1,3-Dichloropropene	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
Dibromochloromethane	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
Dibromomethane	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U
Methylene chloride	0.31	B	0.34	B	0.30	B	0.59	B	0.61	B	0.01	U
Tetrachloroethene	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U	4.60	U
Trans-1,2-Dichloroethene	0.30	U	0.30	U	0.30	U	0.30	U	0.04	U	0.30	U
Trans-1,3-Dichloropropene	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
Trichloroethene	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U	3.20	U
Vinyl chloride	0.55	U	0.55	U	0.55	U	0.55	U	0.55	U	0.55	U

# Appendix F: Complete Analytical Database 110th FG, MIANG, Battle Creek, Michigan

LOCATOR: SAMPLE ID: COLLECTION DATE: ASSOCIATED QC:	BCM12		BCM13		BCM13-GW4		BCM13		BCM13-GW4D		BCM14		BCM15		BCM16	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
	BCM-MW12-GW4 05/23/94 BC-TB4, BC-ER1 BC-FB1, BC-FB2, BC-FB3		BCM-MW13-GW4 05/20/94 BC-ER1		BCM-MW13-GW4 05/20/94 BC-ER1		BCM-MW13-GW4D 05/20/94 BC-ER1		BCM-MW14-GW4 05/22/94 BC-TB6, BC-ER1 BC-FB1, BC-FB2, BC-FB3		BCM-MW15-GW4 05/24/94 BC-TB6, BC-ER3 BC-FB1, BC-FB2, BC-FB3		BCM-MW16-GW5 12/18/94 BC-TB2 BC-FB1			
Aromatic Volatiles Compounds by 8020																
1,2-Dichlorobenzene	0.15	U	0.03	U	0.15	U	0.06	B	0.15	U	0.15	U	0.15	U	0.15	U
1,3-Dichlorobenzene	0.20	U	0.20	U	0.20	U	0.05	B	0.20	U	0.20	U	0.20	U	0.20	U
1,4-Dichlorobenzene	0.15	U	0.03	U	0.15	U	0.07	B	0.15	U	0.15	U	0.15	U	0.15	U
Benzene	0.35	U	0.35	U	0.35	U	0.08	B	0.04	U	0.04	U	0.35	U	0.35	U
Chlorobenzene	0.25	U	0.25	U	0.25	U	0.06	B	0.25	U	0.25	U	0.25	U	0.25	U
Ethylbenzene	0.20	U	0.20	U	0.20	U	0.06	B	0.20	U	0.20	U	0.20	U	0.20	U
Methyl-tert-butyl ether	5	U	5	U	5	U	0.08	B	5	U	5	U	5	U	5	U
Styrene	0.25	U	0.25	U	0.25	U	0.06	B	0.25	U	0.25	U	0.25	U	0.25	U
Toluene	0.24	B	0.02	B	0.25	U	0.14	B	0.11	B	0.11	B	0.25	U	0.25	U
m + p-Xylene	0.50	U	0.50	U	0.50	U	-	B	0.50	U	0.50	U	0.50	U	0.50	U
m-Xylene	-	U	-	U	-	U	0.07	B	-	U	-	U	-	U	-	U
o-Xylene	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
p-Xylene	-	U	-	U	-	U	0.05	B	-	U	-	U	-	U	-	U
Semivolatiles Compounds by CLP																
1,2,4-Trichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	5	U
1,2-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	-	U
1,3-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	-	U
1,4-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	-	U
2,2'-Oxybis(1-chloropropane)	-	U	-	U	-	U	-	U	-	U	-	U	-	U	5	U
2,4,5-Trichlorophenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2,4,6-Trichlorophenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	5	U
2,4-Dichlorophenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U	5	U
2,4-Dimethylphenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U	5	U
2,4-Dinitrophenol	40	U	40	U	40	U	40	U	40	U	40	U	40	U	20	U
2,6-Dinitrotoluene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	5	U
2-Chloronaphthalene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	5	U
2-Chlorophenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U	5	U
2-Methylnaphthalene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	5	U
2-Methylphenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U	5	U
2-Nitroaniline	10	U	10	U	10	U	10	U	10	U	10	U	10	U	20	U
2-Nitrophenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U	5	U

# Appendix F: Complete Analytical Database 110th FG, MIANG, Battle Creek, Michigan

LOCATOR: BCMW12  
SAMPLE ID: BC-MW12-GW4  
COLLECTION DATE: 05/23/94  
ASSOCIATED QC: BC-TB4, BC-ER1  
BC-FB1, BC-FB2, BC-FB3

	BCM12	BCM13	BCM13	BCM13	BCM14	BCM15	BCM16
	BC-MW12-GW4	BC-MW13-GW4	BC-MW13-GW4D	BC-MW14-GW4	BC-MW15-GW4	BC-MW16-GW5	
	05/23/94	05/20/94	05/20/94	05/22/94	05/24/94	12/18/94	
	BC-TB4, BC-ER1	BC-ER1	BC-ER1	BC-TB5, BC-ER1	BC-TB6, BC-ER3	BC-TB2	
	BC-FB1, BC-FB2, BC-FB3			BC-FB1, BC-FB2, BC-FB3	BC-FB1, BC-FB2, BC-FB3	BC-FB1	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT
3,3'-Dichlorobenzidine	10	U	10	U	10	U	5
3-Nitroaniline	20	U	20	U	20	U	20
4,6-Dinitro-2-methylphenol	30	U	30	U	30	U	20
4-Bromophenyl phenyl ether	10	U	10	U	10	U	5
4-Chloro-3-methylphenol	10	U	10	U	10	U	5
4-Chloroaniline	10	U	10	U	10	U	5
4-Chlorophenyl phenyl ether	10	U	10	U	10	U	5
4-Methylphenol	10	U	10	U	10	U	5
4-Nitroaniline	10	U	10	U	10	U	20
4-Nitrophenol	10	U	10	U	10	U	20
Acenaphthene	10	U	10	U	10	U	5
Acenaphthylene	10	U	10	U	10	U	5
Anthracene	10	U	10	U	10	U	5
Benzo(a)anthracene	10	U	10	U	10	U	5
Benzo(a)pyrene	10	U	10	U	10	U	5
Benzo(b)fluoranthene	10	U	10	U	10	U	5
Benzo(g,h,i)perylene	10	U	10	U	10	U	5
Benzo(k)fluoranthene	10	U	10	U	10	U	5
Benzoic acid	2	J	100	U	100	U	-
Benzyl alcohol	10	U	10	U	10	U	-
Butyl benzyl phthalate	10	U	10	U	10	U	5
Chrysene	10	U	10	U	10	U	5
Di-n-butyl phthalate	2	B	2	B	2	U	5
Di-n-octyl phthalate	10	U	10	U	10	U	5
Dibenzo(a,h)anthracene	10	U	10	U	10	U	5
Dibenzofuran	10	U	10	U	10	U	5
Diethyl phthalate	10	U	10	U	10	U	5
Dimethyl phthalate	10	U	10	U	10	U	5
Fluoranthene	10	U	10	U	10	U	5
Fluorene	10	U	10	U	10	U	5
Hexachlorobenzene	10	U	10	U	10	U	5
Hexachlorobutadiene	10	U	10	U	10	U	5
Hexachlorocyclopentadiene	10	U	10	U	10	U	5
Hexachloroethane	10	U	10	U	10	U	5
Indeno(1,2,3-cd)pyrene	10	U	10	U	10	U	5
Isophorone	10	U	10	U	10	U	5

# Appendix F: Complete Analytical Database 110th FG, MIANG, Battle Creek, Michigan

LOCATOR:  
SAMPLE ID:  
COLLECTION DATE:  
ASSOCIATED QC:

BCMW12  
BC-MW12-GW4  
05/23/94  
BC-TB4, BC-ER1  
BC-FB1, BC-FB2, BC-FB3

BCMW13  
BC-MW13-GW4  
05/20/94  
BC-ER1

BCMW13  
BC-MW13-GW4D  
05/20/94  
BC-ER1

BCMW14  
BC-MW14-GW4  
05/22/94  
BC-TB5, BC-ER1  
BC-FB1, BC-FB2, BC-FB3

BCMW15  
BC-MW15-GW4  
05/24/94  
BC-TB6, BC-ER3  
BC-FB1, BC-FB2, BC-FB3

BCMW16  
BC-MW16-GW5  
12/18/94  
BC-TB2  
BC-FB1

	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
N-Nitroso-di-n-propylamine	10	U	10	U	10	U	10	U	10	U	10	U
N-Nitrosodiphenylamine(1)	10	U	10	U	10	U	10	U	10	U	10	U
Naphthalene	10	U	10	U	10	U	10	U	10	U	10	U
Nitrobenzene	10	U	10	U	10	U	10	U	10	U	10	U
Pentachlorophenol	20	U	20	U	20	U	20	U	20	U	20	U
Phenanthrene	10	U	10	U	10	U	10	U	10	U	10	U
Phenol	10	U	10	U	10	U	10	U	10	U	10	U
Pyrene	10	U	10	U	10	U	10	U	10	U	10	U
bis(2-Chloroethoxy)methane	10	U	10	U	10	U	10	U	10	U	10	U
bis(2-Chloroethyl)ether	20	U	20	U	20	U	20	U	20	U	20	U
bis(2-Chloroisopropyl)ether	10	U	10	U	10	U	10	U	10	U	10	U
bis(2-Ethylhexyl)phthalate	22	U	41	U	16	U	6	B	37	U	5	U
Metals by CLP												
Aluminum	62.20	U	62.20	U	62.20	U	62.20	U	62.20	U	62.20	U
Antimony	55.30	U	55.30	U	55.30	U	58.90	U	58.90	U	58.90	U
Arsenic	2.60	U	5	(B)	2.60	U	7.70	(B)	4.10	(B)	4.10	(B)
Barium	57	U	86.90	U	89.70	U	75.10	U	64.40	(B)	64.40	(B)
Beryllium	0.30	U	0.30	U	0.30	U	0.30	U	0.70	U	0.70	U
Cadmium	4.50	UJ	4.50	UJ	4.50	UJ	4.50	UJ	4.70	U	4.70	U
Calcium	66200	U	104000	U	105000	U	76800	U	72700	U	93400	U
Chromium	6	U	6	U	6	U	6	U	6.60	U	2.20	U
Cobalt	9	U	9	U	9	U	9	U	6.30	U	0.50	U
Copper	3.70	(B)	1.70	(B)	1.50	U	1.50	U	10.60	U	3.70	U
Iron	808	U	819	U	917	U	2100	U	1060	U	27.20	U
Lead	1.80	UJ	1.80	U	1.80	U	1.80	U	1.80	UJ	1.60	U
Magnesium	17600	U	24800	U	25400	U	20600	U	17200	U	18600	U
Manganese	201	U	200	U	205	U	79.40	U	230	U	4.80	U
Mercury	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
Nickel	16.60	U	16.60	U	16.60	U	16.60	U	48	U	1.50	U
Potassium	2440	U	1440	U	1280	U	767	U	2309.30	U	1650	U
Selenium	3.40	UJ	3.40	UJ	3.40	UJ	3.40	U	3.40	U	4.40	U
Silver	3.40	U	3.40	U	3.40	U	3.40	U	5.90	U	4.50	U
Sodium	8520	U	11100	U	11400	U	3330	U	3070	U	21600	U
Thallium	4.90	(B)	2.60	UJ	2.60	UJ	3.30	(B)	2.60	UJ	2.70	UJ
Vanadium	3.50	U	3.50	U	3.50	U	3.50	U	5.30	U	0.50	U



**Appendix F: Complete Analytical Database**  
**110th FG, MIANG, Battle Creek, Michigan**

LOCATOR: BCMW12  
SAMPLE ID: BC-MW12-GW4  
COLLECTION DATE: 05/23/94  
ASSOCIATED QC: BC-TB4, BC-ER1  
BC-FB1, BC-FB2, BC-FB3

BCMWW13 BCMW13 BCMW13 BCMW14 BCMW15 BCMW16  
BC-MW13-GW4 BC-MW13-GW4D BC-MW14-GW4 BC-MW15-GW4 BC-MW16-GW5  
05/20/94 05/20/94 05/22/94 05/24/94 12/18/94  
BC-ER1 BC-ER1 BC-TB5, BC-ER1 BC-TB6, BC-ER3 BC-TB2  
BC-FB1, BC-FB2, BC-FB3 BC-FB1, BC-FB2, BC-FB3 BC-FB1

	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Zinc	21.40	B	28	B	11.20	(B	15.90	(B	68.50		3.50	(
Water Parameters by EPA 600/4-79-020												
Chloride	13.30	B	36.30		36.70	B	8.87	B	3.83	B	-	
Sulfate	29.40	B	37		42.90	B	32.60	B	23.20	B	-	
Dissolved Solids	220		428		402		324		306		-	

# Appendix F: Complete Analytical Database 110th FG, MIANG, Battle Creek, Michigan

LOCATOR:  
SAMPLE ID:  
COLLECTION DATE:  
ASSOCIATED QC:

1MW1  
BC1-MW1-GW5  
12/18/94  
BC-TB2  
BC-FB1

1MW1  
BC1-MW1-GW5D  
12/18/94  
BC-TB2  
BC-FB1

1MW3  
BC1-MW3-GW5  
12/18/94  
BC-TB5  
BC-FB1

2MW1  
BC2-MW1-GW4  
05/23/94  
BC-TB5, BC-ER1  
BC-FB1, BC-FB2, BC-FB3

2MW1  
BC2-MW1-GW5  
12/17/94  
BC-TB2  
BC-FB1

3MW1  
BC3-MW1-GW4  
05/23/94  
BC-TB4, BC-ER2  
BC-FB1, BC-FB2

	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Halogenated Volatiles Compounds by 8010												
1,1,1,2-Tetrachloroethane	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,1,1-Trichloroethane	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.02	B
1,1,2,2-Tetrachloroethane	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U
1,1,2-Trichloroethane	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
1,1-Dichloroethane	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,1-Dichloroethene	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,2,3-Trichloropropane	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,2-Dibromoethane (Ethylene di	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,2-Dichlorobenzene	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
1,2-Dichloroethane	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
1,2-Dichloropropane	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
1,3-Dichlorobenzene	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
1,4-Dichlorobenzene	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
2-Chloroethyl vinyl ether	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U
2-Chlorotoluene	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
4-Chlorotoluene	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
Bromobenzene	0.85	U	0.85	U	0.85	U	0.85	U	0.85	U	0.85	U
Bromochloromethane	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
Bromodichloromethane	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U
Bromoform	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Bromomethane	0.45	U	0.45	U	0.45	U	0.45	U	0.45	U	0.45	U
Carbon tetrachloride	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
Chlorobenzene	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
Chloroethane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chloroform	0.35	U	0.35	U	0.00	(B	0.35	U	0.35	U	0.06	B
Chloromethane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Cis-1,3-Dichloropropene	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
Dibromochloromethane	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
Dibromomethane	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U
Methylene chloride	1.20	B	0.02	(B	1.40	B	0.41	B	0.66	(	0.94	B
Tetrachloroethene	0.26	(B	0.30	U	0.30	U	0.20	B	0.30	U	0.30	U
Trans-1,2-Dichloroethene	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
Trans-1,3-Dichloropropene	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
Trichloroethene	0.30	U	0.30	U	0.30	U	0.10	B	0.30	U	0.30	U
Vinyl chloride	0.55	U	0.55	U	0.55	U	0.55	U	0.55	U	0.55	U

# Appendix F: Complete Analytical Database 110th FG, MIANG, Battle Creek, Michigan

LOCATOR:  
SAMPLE ID:  
COLLECTION DATE:  
ASSOCIATED QC:

3MW1  
BC3-MW1-GW4  
05/23/94  
BC-TB4, BC-ER2  
BC-FB1, BC-FB2

2MW1  
BC2-MW1-GW5  
12/17/94  
BC-TB2  
BC-FB1

2MW1  
BC2-MW1-GW4  
05/23/94  
BC-TB5, BC-ER1  
BC-FB1, BC-FB2, BC-FB3

1MW3  
BC1-MW3-GW5  
12/18/94  
BC-TB5  
BC-FB1

1MW1  
BC1-MW1-GW5D  
12/18/94  
BC-TB2  
BC-FB1

1MW1  
BC1-MW1-GW5  
12/18/94  
BC-TB2  
BC-FB1

	1MW1	1MW1	1MW3	2MW1	2MW1	3MW1
	BC1-MW1-GW5	BC1-MW1-GW5D	BC1-MW3-GW5	BC2-MW1-GW4	BC2-MW1-GW5	BC3-MW1-GW4
	12/18/94	12/18/94	12/18/94	05/23/94	12/17/94	05/23/94
	BC-TB2	BC-TB2	BC-TB5	BC-TB5, BC-ER1	BC-TB2	BC-TB4, BC-ER2
	BC-FB1	BC-FB1	BC-FB1	BC-FB1, BC-FB2, BC-FB3	BC-FB1	BC-FB1, BC-FB2

## Aromatic Volatiles Compounds by 8020

	1MW1	1MW1	1MW3	2MW1	2MW1	3MW1
	BC1-MW1-GW5	BC1-MW1-GW5D	BC1-MW3-GW5	BC2-MW1-GW4	BC2-MW1-GW5	BC3-MW1-GW4
	12/18/94	12/18/94	12/18/94	05/23/94	12/17/94	05/23/94
	BC-TB2	BC-TB2	BC-TB5	BC-TB5, BC-ER1	BC-TB2	BC-TB4, BC-ER2
	BC-FB1	BC-FB1	BC-FB1	BC-FB1, BC-FB2, BC-FB3	BC-FB1	BC-FB1, BC-FB2
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
1,2-Dichlorobenzene	0.15	U	0.15	U	0.15	U
1,3-Dichlorobenzene	0.20	U	0.20	U	0.20	U
1,4-Dichlorobenzene	0.15	U	0.15	U	0.19	B
Benzene	0.35	U	0.25	U	0.35	U
Chlorobenzene	0.25	U	0.25	U	0.25	U
Ethylbenzene	0.20	U	0.20	U	0.18	U
Methyl-tert-butyl ether	5	U	5	U	5	U
Styrene	0.25	U	0.25	U	0.25	U
Toluene	0.25	U	0.21	U	0.25	B
m + p-Xylene	0.50	U	-	U	-	U
m-Xylene	-	U	0.13	U	0.10	U
o-Xylene	0.20	U	0.20	U	0.19	U
p-Xylene	-	U	0.13	U	0.10	U

## Semivolatiles Compounds by CLP

	1MW1	1MW1	1MW3	2MW1	2MW1	3MW1
	BC1-MW1-GW5	BC1-MW1-GW5D	BC1-MW3-GW5	BC2-MW1-GW4	BC2-MW1-GW5	BC3-MW1-GW4
	12/18/94	12/18/94	12/18/94	05/23/94	12/17/94	05/23/94
	BC-TB2	BC-TB2	BC-TB5	BC-TB5, BC-ER1	BC-TB2	BC-TB4, BC-ER2
	BC-FB1	BC-FB1	BC-FB1	BC-FB1, BC-FB2, BC-FB3	BC-FB1	BC-FB1, BC-FB2
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
1,2,4-Trichlorobenzene	5	U	5	U	5	U
1,2-Dichlorobenzene	-	U	-	U	-	U
1,3-Dichlorobenzene	-	U	-	U	-	U
1,4-Dichlorobenzene	-	U	-	U	-	U
2,2'-Oxybis(1-chloropropane)	5	U	5	U	5	U
2,4,5-Trichlorophenol	20	U	20	U	20	U
2,4,6-Trichlorophenol	5	U	5	U	5	U
2,4-Dichlorophenol	5	U	5	U	5	U
2,4-Dimethylphenol	5	U	5	U	5	U
2,4-Dinitrophenol	20	U	20	U	20	U
2,4-Dinitrotoluene	5	U	5	U	5	U
2,6-Dinitrotoluene	5	U	5	U	5	U
2-Chloronaphthalene	5	U	5	U	5	U
2-Chlorophenol	5	U	5	U	5	U
2-Methylnaphthalene	5	U	5	U	6	U
2-Methylphenol	5	U	5	U	5	U
2-Nitroaniline	20	U	20	U	20	U
2-Nitrophenol	5	U	5	U	5	U

# Appendix F: Complete Analytical Database 110th FG, MIANG, Battle Creek, Michigan

LOCATOR:  
SAMPLE ID:  
COLLECTION DATE:  
ASSOCIATED QC:

1MW1  
BC1-MW1-GW5  
12/18/94  
BC-TB2  
BC-FB1

1MW1  
BC1-MW1-GW5D  
12/18/94  
BC-TB2  
BC-FB1

1MW3  
BC1-MW3-GW5  
12/18/94  
BC-TB5  
BC-FB1

2MW1  
BC2-MW1-GW4  
05/23/94  
BC-TB5,BC-ER1  
BC-FB1, BC-FB2, BC-FB3

2MW1  
BC2-MW1-GW5  
12/17/94  
BC-TB2  
BC-FB1

3MW1  
BC3-MW1-GW4  
05/23/94  
BC-TB4,BC-ER2  
BC-FB1, BC-FB2

	1MW1 BC1-MW1-GW5 12/18/94 BC-TB2 BC-FB1	1MW1 BC1-MW1-GW5D 12/18/94 BC-TB2 BC-FB1	1MW3 BC1-MW3-GW5 12/18/94 BC-TB5 BC-FB1	2MW1 BC2-MW1-GW4 05/23/94 BC-TB5,BC-ER1 BC-FB1, BC-FB2, BC-FB3	2MW1 BC2-MW1-GW5 12/17/94 BC-TB2 BC-FB1	3MW1 BC3-MW1-GW4 05/23/94 BC-TB4,BC-ER2 BC-FB1, BC-FB2
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
3,3'-Dichlorobenzidine	5	U	5	U	10	U
3-Nitroaniline	20	U	20	U	20	U
4,6-Dinitro-2-methylphenol	20	U	20	U	30	U
4-Bromophenyl phenyl ether	5	U	5	U	10	U
4-Chloro-3-methylphenol	5	U	5	U	10	U
4-Chloroaniline	5	U	5	U	10	U
4-Chlorophenyl phenyl ether	5	U	5	U	10	U
4-Methylphenol	5	U	5	U	10	U
4-Nitroaniline	20	U	20	U	10	U
4-Nitrophenol	20	U	20	U	10	U
Acenaphthene	5	U	5	U	10	U
Acenaphthylene	5	U	5	U	10	U
Anthracene	5	U	5	U	10	U
Benzo(a)anthracene	5	U	5	U	10	U
Benzo(a)pyrene	5	U	5	U	10	U
Benzo(b)fluoranthene	5	U	5	U	10	U
Benzo(g,h,i)perylene	5	U	5	U	10	U
Benzo(k)fluoranthene	5	U	5	U	10	U
Benzoic acid	-	U	-	U	100	U
Benzyl alcohol	-	U	-	U	10	U
Butyl benzyl phthalate	5	U	5	U	10	U
Chrysene	5	U	5	U	10	U
Di-n-butyl phthalate	0.50	U	0.80	U	2	B
Di-n-octyl phthalate	5	U	5	U	10	U
Dibenzo(a,h)anthracene	5	U	5	U	10	U
Dibenzofuran	5	U	5	U	10	U
Diethyl phthalate	5	U	5	U	10	U
Dimethyl phthalate	5	U	5	U	10	U
Fluoranthene	5	U	5	U	10	U
Fluorene	5	U	5	U	10	U
Hexachlorobenzene	5	U	5	U	10	U
Hexachlorobutadiene	5	U	5	U	10	U
Hexachlorocyclopentadiene	5	U	5	U	10	U
Hexachloroethane	5	U	5	U	10	U
Indeno(1,2,3-cd)pyrene	5	U	5	U	10	U
Isophorone	5	U	5	U	10	U

LOCATOR:  
SAMPLE ID:  
COLLECTION DATE:  
ASSOCIATED QC:

## Metals by CLP

**Appendix F: Complete Analytical Database**  
**110th FG, MIANG, Battle Creek, Michigan**

LOCATOR:  
SAMPLE ID:  
COLLECTION DATE:  
ASSOCIATED QC:

1MW1  
BC1-MW1-GW5  
12/18/94  
BC-TB2  
BC-FB1

1MW1  
BC1-MW1-GW5D  
12/18/94  
BC-TB2  
BC-FB1

1MW3  
BC1-MW3-GW5  
12/18/94  
BC-TB5  
BC-FB1

2MW1  
BC2-MW1-GW4  
05/23/94  
BC-TB5, BC-ER1  
BC-FB1, BC-FB2, BC-FB3

2MW1  
BC2-MW1-GW5  
12/17/94  
BC-TB2  
BC-FB1

3MW1  
BC3-MW1-GW4  
05/23/94  
BC-TB4, BC-ER2  
BC-FB1, BC-FB2

RESULT QUAL RESULT QUAL RESULT QUAL RESULT QUAL RESULT QUAL RESULT QUAL

Zinc 0.69 () 2.20 () 2.30 () 11.60 () 8.50 () 4.70 (B)

Water Parameters by EPA 600/4-79-020

Chloride - - - 37.90 B - -

Sulfate - - - 13.20 B - -

Dissolved Solids - - - 360 - -

LOCATOR: 3MW1  
SAMPLE ID: BC3-MW1-GW4D  
COLLECTION DATE: 05/23/94  
ASSOCIATED QC: BC-TB4, BC-ER2  
BC-FB1, BC-FB2

Halogenated Volatiles Compounds by 8010

# Appendix F: Complete Analytical Database 110th FG, MIANG, Battle Creek, Michigan

LOCATOR:  
SAMPLE ID:  
COLLECTION DATE:  
ASSOCIATED QC:

3MW1  
BC3-MW1-GW4D  
05/23/94  
BC-TB4, BC-ER2  
BC-FB1, BC-FB2

3MW2  
BC3-MW2-GW4  
05/23/94  
BC-TB5, BC-ER2  
BC-FB1, BC-FB2

3MW3  
BC3-MW3-GW4  
05/23/94  
BC-TB4, BC-ER2  
BC-FB1, BC-FB2

3MW4  
BC3-MW4-GW4  
05/23/94  
BC-TB4, BC-ER2  
BC-FB1, BC-FB2

3MW5  
BC3-MW5-GW4  
05/23/94  
BC-TB4, BC-ER2  
BC-FB1, BC-FB2

3MW6  
BC3-MW6-GW4  
05/23/94  
BC-TB4, BC-ER2  
BC-FB1, BC-FB2

	3MW1	3MW2	3MW3	3MW4	3MW5	3MW6
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL

## Aromatic Volatiles Compounds by 8020

1,2-Dichlorobenzene	0.04	B	1.80	U	0.15	U	0.15	U
1,3-Dichlorobenzene	0.20	U	2.30	U	0.20	U	0.04	B
1,4-Dichlorobenzene	0.06	U	7	U	0.15	U	0.07	B
Benzene	0.35	U	17	U	0.04	B	0.11	B
Chlorobenzene	0.25	U	0.29	U	0.25	U	0.25	U
Ethylbenzene	0.20	U	47	U	0.89	J	0.16	U
Methyl-tert-butyl ether	5	U	25	U	5	U	5	U
Styrene	0.25	U	0.80	B	0.02	B	0.25	U
Toluene	0.05	B	1.20	B	2.30	B	0.42	B
m + p-Xylene	-		-	U	-	U	-	U
m-Xylene	0.09	B	160	U	2.70	B	0.14	U
o-Xylene	0.20	U	11	U	1.20	B	0.11	B
p-Xylene	0.04	B	63	U	0.13	B	0.06	U

## Semivolatiles Compounds by CLP

1,2,4-Trichlorobenzene	10	U	10	U	10	U	10	U
1,2-Dichlorobenzene	10	U	10	U	10	U	10	U
1,3-Dichlorobenzene	10	U	10	U	10	U	10	U
1,4-Dichlorobenzene	10	U	10	U	10	U	10	U
2,2'-Oxybis(1-chloropropane)	-		-		-		-	
2,4,5-Trichlorophenol	20	U	20	U	20	U	20	U
2,4,6-Trichlorophenol	20	U	20	U	20	U	20	U
2,4-Dichlorophenol	10	U	10	U	10	U	10	U
2,4-Dimethylphenol	10	U	5	U	10	U	10	U
2,4-Dinitrophenol	40	U	40	U	40	U	40	U
2,4-Dinitrotoluene	10	U	10	U	10	U	10	U
2,6-Dinitrotoluene	10	U	10	U	10	U	10	U
2-Chloronaphthalene	10	U	10	U	10	U	10	U
2-Chlorophenol	10	U	10	U	10	U	10	U
2-Methylnaphthalene	10	U	8	U	10	U	10	U
2-Methylphenol	10	U	10	U	10	U	10	U
2-Nitroaniline	10	U	10	U	10	U	10	U
2-Nitrophenol	10	U	10	U	10	U	10	U



# **Appendix F: Complete Analytical Database** **110th FG, MIANG, Battle Creek, Michigan**

LOCATOR: 3MW1  
SAMPLE ID: BC3-MW1-GW4D  
COLLECTION DATE: 05/23/94  
ASSOCIATED QC: BC-TB4, BC-ER2  
BC-FB1, BC-FB2

3MW6  
BC3-MW6-GW4  
05/23/94  
BC-TB4, BC-ER2  
BC-FB1, BC-FB2

3MW5  
BC3-MW5-GW4  
05/23/94  
BC-TB4, BC-ER2  
BC-FB1, BC-FB2

3MW4  
BC3-MW4-GW4  
05/23/94  
BC-TB4, BC-ER2  
BC-FB1, BC-FB2

3MW3  
BC3-MW3-GW4  
05/23/94  
BC-TB4, BC-ER2  
BC-FB1, BC-FB2

3MW2  
BC3-MW2-GW4  
05/23/94  
BC-TB5, BC-ER2  
BC-FB1, BC-FB2

	3MW1	3MW2	3MW3	3MW4	3MW5	3MW6
	BC3-MW1-GW4D	BC3-MW2-GW4	BC3-MW3-GW4	BC3-MW4-GW4	BC3-MW5-GW4	BC3-MW6-GW4
	05/23/94	05/23/94	05/23/94	05/23/94	05/23/94	05/23/94
	BC-TB4, BC-ER2	BC-TB5, BC-ER2	BC-TB4, BC-ER2	BC-TB4, BC-ER2	BC-TB4, BC-ER2	BC-TB4, BC-ER2
	BC-FB1, BC-FB2	BC-FB1, BC-FB2	BC-FB1, BC-FB2	BC-FB1, BC-FB2	BC-FB1, BC-FB2	BC-FB1, BC-FB2
RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT
QUAL		QUAL		QUAL		QUAL
3,3'-Dichlorobenzidine	10	U	10	UJ	10	U
3-Nitroaniline	20	U	20	UJ	20	U
4,6-Dinitro-2-methylphenol	30	U	30	R	30	U
4-Bromophenyl phenyl ether	10	U	10	UJ	10	U
4-Chloro-3-methylphenol	10	U	10	UJ	10	U
4-Chloroaniline	10	U	10	R	10	U
4-Chlorophenyl phenyl ether	10	U	10	UJ	10	U
4-Methylphenol	10	U	10	UJ	10	U
4-Nitroaniline	10	U	10	UJ	10	U
4-Nitrophenol	10	U	10	UJ	10	U
Acenaphthene	10	U	10	UJ	10	U
Acenaphthylene	10	U	10	UJ	10	U
Anthracene	10	U	10	UJ	10	U
Benzo(a)anthracene	10	U	10	UJ	10	U
Benzo(a)pyrene	10	U	10	UJ	10	U
Benzo(b)fluoranthene	10	U	10	UJ	10	U
Benzo(g,h,i)perylene	10	U	10	UJ	10	U
Benzo(k)fluoranthene	10	U	10	UJ	10	U
Benzoic acid	100	U	100	UJ	100	U
Benzyl alcohol	10	U	10	UJ	10	U
Butyl benzyl phthalate	10	U	10	UJ	10	U
Chrysene	10	U	10	UJ	10	U
Di-n-butyl phthalate	2	B	1	J	2	B
Dibenzofuran	10	U	10	UJ	10	U
Dibenzoperylene	10	U	10	UJ	10	U
Diethyl phthalate	10	U	10	UJ	10	U
Dimethyl phthalate	10	U	10	UJ	10	U
Fluoranthene	10	U	10	UJ	10	U
Fluorene	10	U	10	UJ	10	U
Hexachlorobenzene	10	U	10	UJ	10	U
Hexachlorobutadiene	10	U	10	UJ	10	U
Hexachlorocyclopentadiene	10	U	10	UJ	10	U
Hexachloroethane	10	U	10	UJ	10	U
Indeno(1,2,3-cd)pyrene	10	U	10	UJ	10	U
Isophorone	10	U	10	UJ	10	U

# Appendix F: Complete Analytical Database 110th FG, MIANG, Battle Creek, Michigan

LOCATOR: 3MW1  
SAMPLE ID: BC3-MW1-GW4D  
COLLECTION DATE: 05/23/94  
ASSOCIATED QC: BC-TB4, BC-ER2  
BC-FB1, BC-FB2

	3MW1		3MW2		3MW3		3MW4		3MW5		3MW6	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
N-Nitroso-di-n-propylamine	10	U	10	U	10	UJ	10	U	10	U	10	U
N-Nitrosodiphenylamine(1)	10	U	10	U	10	UJ	10	U	10	U	10	U
Naphthalene	10	U	24	U	10	UJ	10	U	10	U	10	U
Nitrobenzene	10	U	10	U	10	UJ	10	U	10	U	10	U
Pentachlorophenol	20	U	20	U	10	R	20	U	20	U	20	U
Phenanthrene	10	U	10	U	10	UJ	10	U	10	U	10	U
Phenol	10	U	10	U	10	R	10	U	10	U	10	U
Pyrene	10	U	10	U	10	UJ	10	U	10	U	10	U
bis(2-Chloroethoxy)methane	10	U	10	U	10	UJ	10	U	10	U	10	U
bis(2-Chloroethyl)ether	20	U	20	U	20	UJ	20	U	20	U	20	U
bis(2-Chloroisopropyl)ether	10	U	10	U	10	UJ	10	U	10	U	10	U
bis(2-Ethylhexyl)phthalate	23	U	4	B	2	J	11	B	6	B	3	B
Metals by CLP												
Aluminum	62.20	U	84.70	U	62.20	U	62.20	U	102	(B)	62.20	U
Antimony	59	(B)	33.30	U	55.30	U	58.80	U	55.30	U	55.30	U
Arsenic	4.60	(B)	39.20	(B)	2.60	U	2.60	U	3.30	(B)	2.60	U
Barium	23.90	(B)	121	(B)	16.10	(B)	90.90	(B)	19.10	(B)	35.60	(B)
Beryllium	0.30	U	0.70	U	0.30	U	0.30	U	0.30	U	0.30	U
Cadmium	4.50	UJ	4.70	U	4.50	UJ	4.50	U	4.50	UJ	4.50	UJ
Calcium	76000	U	91700	U	58200	U	27900	U	66700	U	76600	U
Chromium	6	U	6.60	U	6	U	6.20	(B)	6	U	6	U
Cobalt	9	U	6.30	U	9	U	9	U	9	U	9	U
Copper	1.50	U	10.60	U	1.50	U	1.50	U	1.50	U	1.50	U
Iron	273	B	6670	J	98.30	(B)	24.40	U	197	B	24.40	U
Lead	1.80	U	1.80	UJ	1.80	U	1.80	U	1.80	U	1.80	U
Magnesium	16200	U	16000	U	12400	U	4680	(B)	15000	U	16500	U
Manganese	186	U	374	J	1.20	U	1.20	U	5.70	(B)	149	U
Mercury	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
Nickel	16.60	U	38.80	U	16.60	U	16.60	U	16.60	U	16.60	U
Potassium	714	U	2309.30	U	843	(B)	1300	(B)	714	U	714	U
Selenium	3.40	U	3.40	U	3.40	UJ	3.40	U	3.40	UJ	3.40	UJ
Silver	3.40	U	5.90	U	3.40	UJ	3.40	U	3.40	U	3.40	U
Sodium	1660	(B)	2140	(B)	1270	(B)	2890	(B)	1470	(B)	2220	(B)
Thallium	2.60	UJ	2.60	UJ	2.60	UJ	2.60	U	2.60	U	2.60	UJ
Vanadium	3.50	U	5.30	U	3.50	U	3.50	U	3.50	U	3.50	U

**Appendix F: Complete Analytical Database**  
**110th FG, MIANG, Battle Creek, Michigan**

LOCATOR: 3MW1 3MW2 3MW3 3MW4 3MW5 3MW6  
SAMPLE ID: BC3-MW1-GW4D BC3-MW2-GW4 BC3-MW3-GW4 BC3-MW4-GW4 BC3-MW5-GW4 BC3-MW6-GW4  
COLLECTION DATE: 05/23/94 05/23/94 05/23/94 05/23/94 05/23/94 05/23/94  
ASSOCIATED QC: BC-TB4, BC-ER2 BC-TB5, BC-ER2 BC-TB4, BC-ER2 BC-TB4, BC-ER2 BC-TB4, BC-ER2 BC-TB4, BC-ER2  
BC-FB1, BC-FB2 BC-FB1, BC-FB2 BC-FB1, BC-FB2 BC-FB1, BC-FB2 BC-FB1, BC-FB2 BC-FB1, BC-FB2

	RESULT	QUAL	U	4.10	12.80	()	12.10	()B	5.60	()B	14	()B	12.10	()B
Zinc														
Water Parameters by EPA 600/4-79-020														
Chloride	-				-		-		-		-		-	
Sulfate	-				-		-		-		-		-	
Dissolved Solids	-				-		-		-		-		-	

# Appendix F: Complete Analytical Database 110th FG, MIANG, Battle Creek, Michigan

Criteria for organic compounds is the highest of the Type C Generic Industrial or type B 20 times drinking water values; for inorganic compounds criteria is the highest of the background, Type A default value or the Type B 20 times the drinking water values.

mg/kg μg/kg ID NS	milligrams/kilogram micrograms/kilogram Insufficient data available to develop criteria Not Sampled	Data Validation Qualifiers ( B J U R	Laboratory Qualifiers A B B E J N U X *
Result Qualifiers (1) (a) (b) (c)	Results are presented in units of mg/l Results are presented in units of μg/kg Results are presented in units of mg/kg Criteria does not exist	Result is between the detection limit and the quantitation limit Value is unreliable due to blank contamination value Reported value is estimated Compound analyzed for but not detected Result is unreliable	Result produced from a single point method-of-standard addition Analyte also detected in associated blank (organic) Result between IDL and CRDL (inorganic) Chemical or physical interference during analysis Reported value is estimated Matrix related interference in the sample Compound analyzed for but not detected Sample specific qualifier Non-homogeneous sample matrix

# Appendix F: Complete Analytical Database 110th FG, MIANG, Battle Creek, Michigan

Criteria for organic compounds are the Type B health-based drinking water values; for inorganic compounds they are the highest of the background or the Type B health-based drinking water values.

mg/l µg/l ID NS	milligrams/liter micrograms/liter Insufficient data available to develop criteria Not Sampled	Data Validation Qualifiers ( ) B J U R	Laboratory Qualifiers A B B E J N U X *
Result Qualifiers (a) (b) (c)	Results are presented in units of µg/l Results are presented in units of mg/l Criteria does not exist	Result is between the detection limit and the quantitation limit Value is unreliable due to blank contamination value Reported value is estimated Compound analyzed for but not detected Result is unreliable	Result produced from a single point method-of-standard addition Analyte also detected in associated blank (organic) Result between IDL and CRDL (inorganic) Chemical or physical interference during analysis Reported value is estimated Matrix related interference in the sample Compound analyzed for but not detected Sample specific qualifier Non-homogeneous sample matrix

Leville

KAR Laboratories, Inc.  
4425 Manchester Road  
Kalamazoo, MI 49002

(616) 381-9666

## INVOICE

Earth Technologies  
683 Emory Valley Rd.  
Oak Ridge, TN 37830

Project No.: 941428  
Date Activated: 5/19/94  
Date Reported: 5/27/94  
PO#: 94PG-063-DC4

Attn: Mr. Jack Briegel

Project Desc.: Analysis of aqueous samples for ANG-BC (ET #948901-08).

Quan Item

-----  
21 Nitrogen, nitrate

Quoted Price of 15.00 per sample (21 samples)

315.00

TOTAL DUE

=====

\$315.00

Please indicate Project No. 941428 on check stub or voucher.

I.D. #38-2476290  
A FINANCE CHARGE OF 1 1/2% PER MONTH (18% PER YEAR)  
WILL BE ADDED TO BALANCES AFTER 30 DAYS

ANALYTICAL RESULTS

To: Earth Technologies

Project No: 941428

Report Date: 5/27/94

Project Desc.: Analysis of aqueous samples for ANG-BC (ET #948901-08).

Sample No.:941428-01      Type:aqueous      Rec'd: 5/19/94  
Sampled: 5/19/94 1445      By:CF of ET  
ID: "BC-MW1-GW4"

Nitrogen, nitrate      3.4 mg/L

Sample No.:941428-02      Type:aqueous      Rec'd: 5/19/94  
Sampled: 5/19/94 1220      By:CF of ET  
ID: "BC-MW2-GW4"

Nitrogen, nitrate      2.1 mg/L

Sample No.:941428-03      Type:aqueous      Rec'd: 5/20/94  
Sampled: 5/20/94 1050      By:CF of ET  
ID: "BC-MW3-GW4"

Nitrogen, nitrate      3.6 mg/L

Sample No.:941428-04      Type:aqueous      Rec'd: 5/20/94  
Sampled: 5/20/94 1405      By:CF of ET  
ID: "BC-MW7-GW4"

Nitrogen, nitrate      <0.2 mg/L

Sample No.:941428-05      Type:aqueous      Rec'd: 5/20/94  
Sampled: 5/20/94 1415      By:CF of ET  
ID: "BC-MW8-GW4"

Nitrogen, nitrate      1.2 mg/L

Sample No.:941428-06      Type:aqueous      Rec'd: 5/20/94  
Sampled: 5/20/94 0815      By:CF of ET  
ID: "BC-MW13-GW4"

Nitrogen, nitrate      <0.2 mg/L

Sample No.:941428-07      Type:aqueous      Rec'd: 5/20/94  
Sampled: 5/20/94 1400      By:CF of ET  
ID: "BC-MW15-GW4"

Nitrogen, nitrate      0.8 mg/L

ANALYTICAL RESULTS

To: Earth Technologies

Project No: 941428

Report Date: 5/27/94

Project Desc.: Analysis of aqueous samples for ANG-BC (ET #948901-08).

Sample No.:941428-08      Type:aqueous      Rec'd: 5/20/94  
Sampled: 5/20/94 0845      By:CF of ET  
ID: "BC-MW16-GW4"

Nitrogen, nitrate      <0.2 mg/L

Sample No.:941428-09      Type:aqueous      Rec'd: 5/20/94  
Sampled: 5/20/94 1540      By:CF of ET  
ID: "BC-ER1"

Nitrogen, nitrate      <0.2 mg/L

Sample No.:941428-10      Type:aqueous      Rec'd: 5/20/94  
Sampled: 5/20/94 1510      By:CF of ET  
ID: "BC-FB2"

Nitrogen, nitrate      <0.2 mg/L

Sample No.:941428-11      Type:aqueous      Rec'd: 5/20/94  
Sampled: 5/20/94 1340      By:CF of ET  
ID: "BC-FB3"

Nitrogen, nitrate      <0.2 mg/L

Sample No.:941428-12      Type:aqueous      Rec'd: 5/23/94  
Sampled: 5/23/94 1130      By:CF of ET  
ID: "BC2-MW1-GW4"

Nitrogen, nitrate      0.3 mg/L

Sample No.:941428-13      Type:aqueous      Rec'd: 5/23/94  
Sampled: 5/23/94 0810      By:CF of ET  
ID: "BC-MW4-GW4"

Nitrogen, nitrate      4.0 mg/L



ANALYTICAL RESULTS

To: Earth Technologies

Project No: 941428

Report Date: 5/27/94

Project Desc.: Analysis of aqueous samples for ANG-BC (ET #948901-08).

Sample No.: 941428-14      Type: aqueous      Rec'd: 5/23/94  
Sampled: 5/23/94 1025      By: CF of ET  
ID: "BC-MW5-GW4"

Nitrogen, nitrate      1.9 mg/L

Sample No.: 941428-15      Type: aqueous      Rec'd: 5/23/94  
Sampled: 5/22/94 1447      By: CF of ET  
ID: "BC-MW6-GW4"

Nitrogen, nitrate      0.4 mg/L

Sample No.: 941428-16      Type: aqueous      Rec'd: 5/23/94  
Sampled: 5/22/94 1610      By: CF of ET  
ID: "BC-MW9-GW4"      BC-MW14-GW4

Nitrogen, nitrate      &lt;0.2 mg/L

Sample No.: 941428-17      Type: aqueous      Rec'd: 5/23/94  
Sampled: 5/22/94 1040      By: CF of ET  
ID: "BC-MW11-GW4"

Nitrogen, nitrate      1.8 mg/L

Sample No.: 941428-18      Type: aqueous      Rec'd: 5/23/94  
Sampled: 5/22/94 1130      By: CF of ET  
ID: "BC-MW12-GW4"

Nitrogen, nitrate      0.6 mg/L

Sample No.: 941428-19      Type: aqueous      Rec'd: 5/24/94  
Sampled: 5/23/94 1600      By: CF of ET  
ID: "BC-MW9-GW4"

Nitrogen, nitrate      0.4 mg/L

Sample No.: 941428-20      Type: aqueous      Rec'd: 5/24/94  
Sampled: 5/23/94 1615      By: CF of ET  
ID: "BC-MW18-GW4"

Nitrogen, nitrate      0.4 mg/L

ANALYTICAL RESULTS

To: Earth Technologies

Project No: 941428

Report Date: 5/27/94

Project Desc.: Analysis of aqueous samples for ANG-BC (ET #948901-08).

Sample No.: 941428-21  
Sampled: 5/24/94 1320  
ID: "BC-ER3"

Type: aqueous  
By: CF of ET

Rec'd: 5/24/94

Nitrogen, nitrate

<0.2 mg/L

Unless otherwise noted, test results represent the sample(s) as they were received.

KAR Laboratories, Inc.  
4425 Manchester Road  
Kalamazoo, MI 49002

(616) 381-9666

ANALYTICAL REPORT

To: Earth Technologies  
683 Emory Valley Rd.  
Oak Ridge, TN 37830

Attn: Mr. Jack Briegel

Proj. No.: 941428  
Client No.: 1660  
Date Activated: 5/19/94  
Date Promised: 6/01/94  
Date Reported: 5/27/94  
PO#: 94PG-063-DC4

Project Desc.: Analysis of aqueous samples for ANG-BC (ET #948901-08).

Dear Client:

Attached you will find test results for Project No. 941428. Please refer to this Project No. if you have any questions regarding this work. Unless noted otherwise all tests were performed within the maximum U.S. EPA allowable holding times.

Respectfully submitted,  
KAR Laboratories, Inc.

*William H. Bouma*

Michael J. Jaeger  
Director of Laboratories

1- SEMI-VOLATILE ORGANICS 1  
1- USEPA-8270 B/N/A SCAN 1

{ EARTH TECH - OAK RIDGE  
Proj: 110th Fighter Group  
HICH A.N.G.  
Subm: 17-May-1995 Sampling  
Sample: BC1842546

Parameter	Result ug/l	Parameter	Result ug/l
Acenaphthene	14	2,4-Dimethylphenol	5.0
Acenaphthylene	5.0	4,6-Dinitro-2-Methylphenol	20
Anthracene	5.0	2,4-Dinitrophenol	5.0
Benzo (a) Anthracene	5.0	2,4-Dinitrotoluene	5.0
Benzo (a) Pyrene	5.0	2,6-Dinitrotoluene	5.0
Benzo (b,k) Fluoranthene	5.0	Fluoranthene	18
Benzo (g,h,i) Perylene	5.0	Fluorene	5.0
Benzoic Acid	50	Hexachlorobenzene	5.0
Benzyl Alcohol	50	Hexachlorobutadiene	5.0
Bis (2-Chloroethoxy)-Methane	5.0	Hexachlorocyclopentadiene	5.0
Bis (2-Chloroethyl) Ether	5.0	Hexachloroethane	5.0
Bis (2-Chloroisopropyl)-Ether	5.0	Indeno (1,2,3-cd) Pyrene	5.0
Bis (2-ethylhexyl)-Phthalate	5.0	Isophorone	5.0
4-Bromophenyl Phenylether	5.0	2-Methylnaphthalene	5.0
Butyl Benzyl Phthalate	5.0	2-Methylphenol	5.0
4-Chloro-3-Methylphenol	5.0	4-Methylphenol	5.0
4-Chloroaniline	20	N-Nitrosodi-n-Propylamine	5.0
2-Chloronaphthalene	5.0	N-Nitroso-di-phenylamine	5.0
2-Chloronaphthal	5.0	Naphthalene	5.0
4-Chlorophenylphenyl-Ether	5.0	2-Nitroaniline	20
Chrysene	5.0	3-Nitroaniline	20
Di-n-Butylphthalate	5.0	4-Nitroaniline	5.0
Di-n-Octylphthalate	5.0	Nitrobenzene	5.0
Dibenzo (a,h) Anthracene	5.0	2-Nitrophenol	20
Dibenzofuran	5.0	4-Nitrophenol	20
1,2-Dichlorobenzene	5.0	Pentachlorophenol	28
1,3-Dichlorobenzene	5.0	Phenanthrene	5.0
1,4-Dichlorobenzene	20	Phenol	5.0
3,3'-Dichlorobenzidine	5.0	Pyrene	5.0
2,4-Dichlorophenol	5.0	1,2,4-Trichlorobenzene	5.0

{ SEMI-VOLATILE ORGANICS }  
{ USEPA-8270 B/W/A SCAN }  
{

{ EARTH TECH - OAK RIDGE } Submittal Number 32429- 11  
Proj: 110th Fighter Group Date Sampled: 05/17/95 Time: 09:20  
NICH A.N.G. Date Received: 05/17/95 Time: 13:45  
Subm: 17-May-1995 Sampling Analysis Date: 05/31/95  
Sample: BC1M28M6 Lab Sample No: 117910

Parameter	Result ug/l	Parameter	Result ug/l
Diethylphthalate	<5.0	2,4,5-Trichlorophenol	<50
Dimethylphthalate	<5.0	2,4,6-Trichlorophenol	<5.0

PRELIMINARY

{ANALYTICAL REPORT}

EARTH TECH - DAK RIDGE  
 Proj: 110th Fighter Group  
 MICH A.N.G.  
 Subm: 17-May-1995 Sampling

Submittal Number: 32429- 11  
 Location: .00  
 CCS Number  
 CCS Manager: Jack Briegel

BC1M126M6

Reporting Units  
 Limit

Lab Sample No: 117910

Arsenic, Total	53	ug/l
Cadmium, Total	(0.2	ug/l
Chromium, Total	(50	ug/l
Copper, Total	(10	ug/l
Lead, Total	(1.0	ug/l
Mercury, Total	(0.2	ug/l
Selenium, Total	(2.0	ug/l
Silver, Total	(0.2	ug/l
Zinc, Total	(20	ug/l
Antimony, Total	(2.0	ug/l
Beryllium, Total	(10	ug/l
Nickel, Total	(10	ug/l
Thallium, Total	(2.0	ug/l
Barium, Total	180	ug/l
Semi-Volatile Organics	Enclosed	
USEPA-8270 B/N/A Scan	Enclosed	
Volatile Organics		
USEPA-8260		

Sampled by: J. Briegel  
 Date Sampled: 05/17/95  
 Time Sampled: 09:20  
 Date Received: 05/17/95  
 Time Received: 13:45

PRELIMINARY

{ VOLATILE ORGANICS }  
{ USEPA-8260 }

{ EARTH TECH - OAK RIDGE } Submittal Number 32429- 11  
 Proj: 110th Fighter Group Date Sampled: 05/17/95 Time: 09:20  
 MICH A.N.G. Date Received: 05/17/95 Time: 13:45  
 Subm: 17-May-1995 Sampling Analysis Date: 05/23/95  
 Sample: BC1HW26W6 Lab Sample No: 117910

Parameter	Result ug/l	Parameter	Result ug/l
1,2-Dichloroethylene- (total)	C2.0	Chlorobenzene	C1.0
1,1-Dichloroethylene	C1.0	Chloroethane	C1.0
1,1-Dichloroethane	C1.0	Chloroform	C1.0
1,1,1-Trichloroethane	C1.0	Chloromethane	C1.0
1,2-Dichloroethane	C1.0	cis-1,3-Dichloropropylene	C1.0
1,2-Dichloropropane	C1.0	Dibromochloromethane	C1.0
1,1,2,2-Tetrachloroethane	C1.0	Ethylbenzene	C1.0
1,1,2-Trichloroethane	C1.0	2-Butanone (MEK)	C50
2-Chloroethyl Vinyl Ether	C10	Methylene Chloride	C1.0
2-Hexanone	C50	Styrene	C1.0
4-Methyl-2-Pentanone	C50	Tetrachloroethylene	C1.0
Acetone	C50	Toluene	C1.0
Benzene	C1.0	trans-1,3-Dichloropropene	C1.0
Bromomethane	C1.0	Trichloroethylene	C1.0
Bromodichloromethane	C1.0	Vinyl Acetate	C10
Bromoform	C1.0	Vinyl Chloride	C1.0
Carbon Disulfide	C5.0	Xylene, Total	C3.0
Carbon Tetrachloride	C1.0		

PRELIMINARY

**DATA VALIDATION REPORT**  
**INORGANIC METALS (Priority Pollutants) ANALYSES**  
**EPA CLP ILM03.0**

**Case#: 500639 SDG#: 936480**

**Battle Creek, Michigan**

**Samples:**

BCER1	BCER2	BCFB1	BCFB2
BCMw1GW4	BCMw2GW4	BC3MW1GW4	BC3MW3GW4
BC3MW4GW4	BC3MW5GW4	BC3MW6GW4	BCMw11GW4
BCMw12GW4	BCMw13GW4	BCMw14GW4	BCMw16GW4
BCMw18GW4	BCMw3GW4	BCMw4GW4	BC3MW17GW4

**I. Sample Holding Times:** Acceptable/All criteria were met.

All samples were analyzed within the required holding time of 180 days. No qualifiers were added to the data.

**II. Calibration:** Acceptable/All criteria were met.

The required number of standards for the initial calibration were analyzed. All correlation coefficients were equal to or greater than 0.995.

The laboratory analyzed a continuing calibration verification (CCV) standard at the required frequency of one every ten samples. The percent recoveries of the CCV associated with the environmental sample results were within control limits of 90-110% for ICP and GFAA. No qualifiers were added to the data due to calibration error.

**III. Blank Analyses:** Acceptable/With the following exceptions:

Method and Preparation blank analysis indicated the presence of several elements. Sample results greater than IDL and less than 5 times blank concentration were qualified "B", blank contamination:

Sample ID #	Compound	Qualifier
BCER1	Zn	B
BCER2	Zn	B
BCFB2	Zn	B
BCMw1GW4	Fe	B
	Zn	B
BCMw2GW4	Cu	B
	Zn	B
BC3MW1GW4	As	B
	Zn	B
BC3MW3GW4	Fe	B



Sample ID #	Compound	Qualifier
	Zn	B
BCER7	Pb	B
BC3MW4GW4	Zn	B
BC3MW5GW4	As	B
	Fe	B
	Mn	B
	Zn	B
BC3MW6GW4	Zn	B
BCMw11GW4	Cu	B
	Tl	B
	Zn	B
BCMw12GW4	Cu	B
	Tl	B
	Zn	B
BCMw13GW4	As	B
	Cu	B
	Zn	B
BCMw14GW4	As	B
	Tl	B
	Zn	B
BCMw3GW4	Cu	B
	Zn	B
BCMw4GW4	Cu	B
	Mn	B
	Tl	B
	Zn	B
BC3MW17GW4	As	B
	Fe	B
BCMw16GW4	Zn	B
BCMw18GW4	Be	B

**IV. ICP Interference Check Sample (ICS) Analyses: Acceptable/All criteria met**

Interference check samples were analyzed at the beginning and end of each ICP analytical run. The percent recoveries were within the 80-120% recovery range. No qualifiers were added to the data.

**V. Duplicate Sample Analyses:** Acceptable/All criteria met

All duplicate sample analyses were found to be within control limits. No qualifiers were added to the data.

**VI. Spike Analyses:** Acceptable/All criteria met

One compound was found to be outside control limits in matrix spike analysis: cadmium. Cadmium was not detected in any sample in the package. In all samples, cadmium was qualified "UJ", not detected, estimated.

**VII. Serial Dilutions:** Acceptable/All criteria met

Serial dilution analysis indicated two elements outside control limits: iron and zinc. No sample detects were found to be  $> 50 \times$  IDL. No qualifiers were added to the data.

**VIII. Laboratory Control Sample (LCS) Analyses:** Acceptable/All criteria met

LCS analysis was performed, and all %recoveries were found to be within control limits of 75-125%. No qualifiers were added to the data.

**DATA VALIDATION REPORT**  
**INORGANIC METALS (Priority Pollutants) ANALYSES**  
**EPA CLP ILM03.0**  
**Case#: 500639 SDG#: 936485**  
**Battle Creek, Michigan**

**Samples:**

BCER3	BC2MW1GW4	BC3MW2GW4	BCMW15GW4
BCMW5GW4	BCMW6GW9	BCMW7GW9	BCMW8GW9
BCMW9GW4			

**I. Sample Holding Times:** Acceptable/All criteria were met.

All samples were analyzed within the required holding time of 180 days. No qualifiers were added to the data.

**II. Calibration:** Acceptable/All criteria were met.

The required number of standards for the initial calibration were analyzed. All correlation coefficients were equal to or greater than 0.995.

The laboratory analyzed a continuing calibration verification (CCV) standard at the required frequency of one every ten samples. The percent recoveries of the CCV associated with the environmental sample results were within control limits of 90-110% for ICP and GFAA. No qualifiers were added to the data due to calibration error.

**III. Blank Analyses:** Acceptable/With the following exceptions:

Method and Preparation blank analysis indicated the presence of barium. Results greater than IDL and less than 5 times blank concentration were qualified "B", blank contamination:

Sample ID #	Compound	Qualifier
BC2MW1GW4	Ba	B
BC3MW2GW4	Ba	B
BCMW15GW4	Ba	B
BCMW5GW4	Ba	B
BCMW6GW4	Ba	B
BCMW7GW4	Ba	B
BCMW8GW4	Ba	B
BCMW9GW4	Ba	B

**IV. ICP Interference Check Sample (ICS) Analyses:** Acceptable/All criteria met

Interference check samples were analyzed at the beginning and end of each ICP analytical run. The percent recoveries were within the 80-120% recovery range. No qualifiers were added to the data.

**V. Laboratory Control Sample (LCS) Analyses:** Acceptable/All criteria met

LCS analysis was performed, and all %recoveries were found to be within control limits of 75-125%, with one exception: Silver indicated %recovery of 67.5%. No qualifiers were added to the data.

**VI. Spike/Duplicate:** Acceptable/All criteria met

Three elements were found to be outside control limits for %recovery in matrix spike analysis: lead, thallium, and iron. Sample detects were qualified as follows:

Sample ID #	Element	Qualifier
BCER3	Fe	UJ
	Pb	UJ
	Tl	UJ
BC2MW1GW4	Fe	J
	Pb	UJ
	Tl	UJ
BC3MW2GW4	Fe	J
	Pb	UJ
	Tl	UJ
BCM5W5GW4	Fe	J
	Pb	UJ
	Tl	UJ
BCM5W6GW4	Fe	J
	Pb	UJ
	Tl	UJ
BCM5W7GW4	Fe	J
	Pb	UJ
	Tl	UJ
BCM5W8GW4	Fe	J
	Pb	UJ
	Tl	UJ
BCM5W9GW4	Fe	J
	Pb	UJ
	Tl	UJ

**VII. Duplicate analyses:** Acceptable/All criteria met

All duplicate sample analyses were found to be within control limits. No qualifiers were added to the data.

**VIII. Serial Dilutions:** Acceptable/All criteria met

Serial dilution analysis indicated five elements outside control limits: Al, Fe, Mn, Na, and Zn. No sample contained any of these analytes at concentrations  $> 50 \times \text{IDL}$ . No qualifiers were added to the data.

**DATA VALIDATION REPORT  
INORGANIC METALS (LEAD) ANALYSES  
EPA CLP ILM03.0  
Case#: 500639 SDG#: 958857  
Battle Creek, Michigan**

**Samples:**

BCER6                      BCER7

**I. Sample Holding Times:** Acceptable/All criteria were met.

All samples were analyzed within the required holding time of 180 days. No qualifiers were added to the data.

**II. Calibration:** Acceptable/All criteria were met.

The required number of standards for the initial calibration were analyzed. All correlation coefficients were equal to or greater than 0.995.

The laboratory analyzed a continuing calibration verification (CCV) standard at the required frequency of one every ten samples. The percent recoveries of the CCV associated with the environmental sample results were within control limits of 90-110% for ICP and GFAA. No qualifiers were added to the data due to calibration error.

**III. Blank Analyses:** Acceptable/With the following exceptions:

Method and Preparation blank analysis indicated the presence of lead. Results greater than IDL and less than 5 times blank concentration were qualified "B", blank contamination:

Sample ID #	Compound	Qualifier
BCER6	Pb	B
BCER7	Pb	B

**IV. ICP Interference Check Sample (ICS) Analyses:** Acceptable/All criteria met

Interference check samples were analyzed at the beginning and end of each ICP analytical run. The percent recoveries were within the 80-120% recovery range. No qualifiers were added to the data.

**V. Laboratory Control Sample (LCS) Analyses:** Acceptable/All criteria met

LCS analysis was performed, and all %recoveries were found to be within control limits of 75-125%. No qualifiers were added to the data.

**Matrix Spike tests were not performed.  
Duplicate analyses were not performed.  
Serial Dilutions were not performed.**

**DATA VALIDATION REPORT  
INORGANIC METALS (PRIORITY POLLUTANTS) ANALYSES  
EPA CLP ILM03.0  
Case#: 500639 SDG#: 295884  
Battle Creek, Michigan**

**Samples:**

BCER3

BCER5

BCFB3

BCFB6

**I. Sample Holding Times:** Acceptable/All criteria were met.

All samples were analyzed within the required holding time of 180 days. No qualifiers were added to the data.

**II. Calibration:** Acceptable/All criteria were met.

The required number of standards for the initial calibration were analyzed. All correlation coefficients were equal to or greater than 0.995.

The laboratory analyzed a continuing calibration verification (CCV) standard at the required frequency of one every ten samples. The percent recoveries of the CCV associated with the environmental sample results were within control limits of 90-110% for ICP and GFAA. No qualifiers were added to the data due to calibration error.

**III. Blank Analyses:** Acceptable/With the following exceptions:

Method and Preparation blank analysis indicated the presence of three elements: antimony, beryllium, and zinc. Results greater than IDL and less than 5 times blank concentration were qualified "B", blank contamination:

**IV. ICP Interference Check Sample (ICS) Analyses:** Acceptable/All criteria met

Interference check samples were analyzed at the beginning and end of each ICP analytical run. The percent recoveries were within the 80-120% recovery range. No qualifiers were added to the data.

**V. Laboratory Control Sample (LCS) Analyses:** Acceptable/All criteria met

LCS analysis was performed, and all %recoveries were found to be within control limits of 75-125%. No qualifiers were added to the data.

**Matrix Spike tests were not performed.  
Duplicate analyses were not performed.  
Serial Dilutions were not performed.**

**DATA VALIDATION REPORT  
INORGANIC METALS (LEAD) ANALYSES  
EPA CLP ILM03.0  
Case#: 500639 SDG#: 983913  
Battle Creek, Michigan**

**Samples:**

1MW22022

1MW21012

**I. Sample Holding Times:** Acceptable/All criteria were met.

All samples were analyzed within the required holding time of 180 days. No qualifiers were added to the data.

**II. Calibration:** Acceptable/All criteria were met.

The required number of standards for the initial calibration were analyzed. All correlation coefficients were equal to or greater than 0.995.

The laboratory analyzed a continuing calibration verification (CCV) standard at the required frequency of one every ten samples. The percent recoveries of the CCV associated with the environmental sample results were within control limits of 90-110% for ICP and GFAA. No qualifiers were added to the data due to calibration error.

**III. Blank Analyses:** Acceptable/With the following exceptions:

Method and Preparation blank analysis indicated no presence of lead. No qualifiers were added to the data.

**IV. ICP Interference Check Sample (ICS) Analyses:** Acceptable/All criteria met

Interference check samples were analyzed at the beginning and end of each ICP analytical run. The percent recoveries were within the 80-120% recovery range. No qualifiers were added to the data.

**V. Duplicates:** Acceptable/All criteria met

Duplicate analysis indicated lead was outside control limits of ( + /- )2x CRDL for %RPD. Both samples were qualified "J", estimated, based on duplicate sample analysis.

**VI. Spike Analysis:** Acceptable/All criteria met

All spike recoveries were found to be within control limits. No qualifiers were added to the data.



**VII. Serial Dilutions:** Acceptable/All criteria met

All serial dilution results did not apply to the detected concentrations of lead, as detects were  $< 50 \times$  IDL. No qualifiers were added to the data.

**VIII. Laboratory Control Sample (LCS) Analyses:** Acceptable/All criteria met

LCS analysis was performed, and all %recoveries were found to be within control limits of 75-125%. No qualifiers were added to the data.

**DATA VALIDATION REPORT  
INORGANIC METALS (LEAD) ANALYSES  
EPA CLP ILM03.0  
Case#: 500639 SDG#: 938939  
Battle Creek, Michigan**

**Sample:**

BCER02

**I. Sample Holding Times:** Acceptable/All criteria were met.

All samples were analyzed within the required holding time of 180 days. No qualifiers were added to the data.

**II. Calibration:** Acceptable/All criteria were met.

The required number of standards for the initial calibration were analyzed. All correlation coefficients were equal to or greater than 0.995.

The laboratory analyzed a continuing calibration verification (CCV) standard at the required frequency of one every ten samples. The percent recoveries of the CCV associated with the environmental sample results were within control limits of 90-110% for ICP and GFAA. No qualifiers were added to the data due to calibration error.

**III. Blank Analyses:** Acceptable/With the following exceptions:

Method and Preparation blank analysis indicated the presence of lead. Results greater than IDL and less than 5 times blank concentration were qualified "B", blank contamination:

Sample ID #	Compound	Qualifier
BCER02	Pb	B

**IV. ICP Interference Check Sample (ICS) Analyses:** Acceptable/All criteria met

Interference check samples were analyzed at the beginning and end of each ICP analytical run. The percent recoveries were within the 80-120% recovery range. No qualifiers were added to the data.

**V. Laboratory Control Sample (LCS) Analyses:** Acceptable/All criteria met

LCS analysis was performed, and all %recoveries were found to be within control limits of 75-125%. No qualifiers were added to the data.

**Matrix Spike tests were not performed.  
Duplicate analyses were not performed.  
Serial Dilutions were not performed.**

**DATA VALIDATION REPORT**  
**INORGANIC METALS (Priority Pollutants) ANALYSES**  
**EPA CLP ILM03.0**  
**Case#: 50063 SDG#: 983957**  
**Battle Creek, Michigan**

**Samples:**

BCBGSS04	BCBGSS01	BCBGSS02	BCBGSS03
BCBG20507	BCBG30507	BCBG40507	BCBG10507
BC1SS14	BC1SS11	BC1SS12	BC1SS13
BCBGSS03D			

**I. Sample Holding Times:** Acceptable/All criteria were met.

All samples were analyzed within the required holding time of 180 days. No qualifiers were added to the data.

**II. Calibration:** Acceptable/With the following exceptions:

The required number of standards for the initial calibration were analyzed. All correlation coefficients were equal to or greater than 0.995.

The laboratory analyzed a continuing calibration verification (CCV) standard at the required frequency of one every ten samples. The percent recoveries of the CCV associated with the environmental sample results were within control limits of 90-110% for ICP and GFAA, with one exception; initial calibration of sample BCBG30507 indicated %recovery for thallium of 111.5%. Thallium was qualified "UJ", not detected, estimated for this sample. No other qualifiers were added to the data due to calibration error.

**III. Blank Analyses:** Acceptable/With the following exceptions:

Method and Preparation blank analysis indicated the presence of beryllium. Results greater than IDL and less than 5 times blank concentration were qualified "B", blank contamination:

Sample ID #	Compound	Qualifier
BCBGSS02	Be	B
BCBG20507	Be	B
BCBG30507	Be	B
BCBG40507	Be	B
BCBG10507	Be	B

**IV. ICP Interference Check Sample (ICS) Analyses:** Acceptable/All criteria met

Interference check samples were analyzed at the beginning and end of each ICP analytical run. The percent recoveries were within the 80-120% recovery range. No qualifiers were added to the data.

**V. Serial Dilution Analysis:** Acceptable/All criteria met

Five-fold serial dilution analysis indicated four analytes outside control limits; Antimony, beryllium, selenium, and nickel. All detected concentrations of these elements were < IDL, and no qualifiers were added to the data.

**VI. Duplicate Sample Analysis:** Acceptable/All criteria met

Duplicate sample analysis indicated two analytes outside control limits; arsenic and chromium. The following qualifiers were added to the following analytes, based on results of duplicate sample analysis:

Sample ID #	Compound	Qualifier
BCBGSS04	As	J
	Cr	J
BCBGSS01	As	J
BCBGSS02	As	J
BCBGSS02	As	J
BCBGSS03	As	J
BCBG20507	As	J
BCBG30507	As	J
BCBG40507	As	J
BCBG10507	As	J
BC1SS14	As	J
BC1SS11	As	J
BC1SS12	As	J
BC1SS13	As	J
BCBGSS03D	As	J

**VII. Spike Analysis:** Matrix spike analysis indicated several elements outside control limits for low %RPD: Antimony, selenium, silver, zinc, and arsenic. Data were qualified "J", estimated, where detected, and "UJ", not detected, estimated, where not detected:

Sample ID #	Compound	Qualifier
BCBGSS04	Se	UJ
	Ag	UJ
	Zn	J
	Sb	R
BCBGSS01	Se	UJ
	Ag	UJ
	Zn	J

Sample ID #	Compound	Qualifier
	Sb	R
BCBGSS02	Se	UJ
	Ag	UJ
	Zn	J
	Sb	R
BCBGSS03	Se	J
	Ag	UJ
	Zn	J
	Sb	J
BCBG20507	Se	UJ
	Ag	UJ
	Zn	J
	Sb	J
BCBG30507	Se	UJ
	Ag	UJ
	Zn	J
	Sb	R
BCBG40507	Se	UJ
	Ag	UJ
	Zn	J
	Sb	R
BCBG10507	Se	UJ
	Ag	UJ
	Zn	J
	Sb	R
BC1SS14	Se	UJ
	Ag	UJ
	Zn	J
	Sb	R
BC1SS11	Se	J
	Ag	UJ
	Zn	J
	Sb	R
BC1SS12	Se	J
	Ag	UJ
	Zn	J
	Sb	R

Sample ID #	Compound	Qualifier
BC1SS13	Se	J
	Ag	UJ
	Zn	J
	Sb	R
BCBGSS03D	Se	UJ
	Ag	UJ
	Zn	J
	Sb	R

Data for antimony were qualified "R", unusable, where antimony was not detected, due to very low recoveries in spike analysis.

**VIII. Laboratory Control Sample (LCS) Analyses:** Acceptable/All criteria met

LCS analysis was performed, and all %recoveries were found to be within control limits of 75-125% with one exception: silver was found to have 0% recovery. No qualifiers were added to the data.

**DATA VALIDATION REPORT**  
**INORGANIC METALS (Priority Pollutants) ANALYSES**  
**EPA CLP SW-846 ILM03.0**  
**Case#: 50063 SDG#: 298397**  
**Battle Creek, Michigan**

**Samples:**

BC2MW1GW5	BCMW4GW5	BC1MW1GW5D	BCFB01
BCFB02	BCMW16GW5	BC1MW1GW5	

**I. Sample Holding Times:** Acceptable/All criteria were met.

All samples were analyzed within the required holding time of 180 days. No qualifiers were added to the data.

**II. Calibration:** Acceptable/All criteria were met.

The required number of standards for the initial calibration were analyzed. All correlation coefficients were equal to or greater than 0.995.

The laboratory analyzed a continuing calibration verification (CCV) standard at the required frequency of one every ten samples. The percent recoveries of the CCV associated with the environmental sample results were within control limits of 90-110% for ICP and GFAA, with the exception of thallium. No detects > IDL were reported, and no qualifiers were added to the data due to calibration error.

**III. Blank Analyses:** Acceptable/With the following exceptions:

Method and Preparation blank analysis indicated the presence of many elements in associated method blanks. Results greater than IDL and less than 5 times blank concentration were qualified "B", blank contamination:

Sample ID #	Compound	Qualifier
BCFB01	Al	B
	Ba	B
	Ca	B
	Cu	B
	Fe	B
	Pb	B
	Mg	B
	Mn	B
	K	B
	Na	B

Sample ID #	Compound	Qualifier
	Zn	B
BCFB02	Al	B
	Ca	B
	Fe	B
	Pb	B
	Mg	B
	Mn	B
	K	B
	Na	B
	Zn	B
BC2MW1GW5	Al	B
	Ba	B
	Ca	B
	Co	B
	Cu	B
	Mg	B
	Ni	B
	K	B
BCM4W4GW5	Al	B
	Ba	B
	Ca	B
	Cu	B
	Mg	B
	K	B
	Zn	B
BC1MW3GW5	Al	B
	Ba	B
	Ca	B
	Cu	B
	Pb	B
	Mg	B
	K	B
	Na	B
	Zn	B
B1MW1GW5D	Al	B
	Ba	B
	Ca	B



Sample ID #	Compound	Qualifier
	Cu	B
	Mg	B
	K	B
	Na	B
	Zn	B
BCM16GW5	Al	B
	Ba	B
	Ca	B
	Cu	B
	Mg	B
	K	B
	Zn	B
BC1MW1GW5	Al	B
	Ba	B
	Ca	B
	Cu	B
	Mg	B
	K	B
	Zn	B

**IV. ICP Interference Check Sample (ICS) Analyses:** Acceptable/All criteria met

Interference check samples were analyzed at the beginning and end of each ICP analytical run. The percent recoveries were within the required 80-120% recovery range. No qualifiers were added to the data.

**V. Laboratory Control Sample (LCS) Analyses:** Acceptable/All criteria met

LCS analysis was performed, and all %recoveries were found to be within control limits of 75-125%. No qualifiers were added to the data.

**VI. Spike Analyses:** Matrix spike analysis indicated two elements outside of control limits for %recovery: thallium and mercury. No detects were reported for either element in any sample. "UJ", not detected, estimated, qualifiers were added to the data for thallium and mercury in all samples in the SDG.

**VII. Duplicate Analyses:** Duplicate sample analysis indicated several elements outside control limits for RPD. Detects for these elements were qualified "J", estimated, and non-detects were qualified "UJ", not detected, estimated, as follows:

Sample ID #	Compound	Qualifier
BC2MW1GW5	Fe	J
	Zn	J
BCM4W4GW5	Fe	UJ
BC1MW3GW5	Fe	J
B1MW1GW5D	Fe	UJ
BCM4W16GW5	Fe	UJ
BC1MW1GW5	Fe	UJ

**VIII. Serial Dilutions:** Acceptable/All criteria met

Serial dilution analysis indicated several elements outside control limits. None of the elements outside control limits were present in any sample at concentrations > 50 times IDL. No qualifiers were added to the data.

**DATA VALIDATION REPORT  
SEMIVOLATILE ORGANIC COMPOUND ANALYSES  
EPA CLP 3/90 SOW OLM01.9  
Case#: 29588 SDG#: 00003  
Battle Creek, Michigan**

**Samples:**

BCER5  
BCFB6

BCER6

BCER7

BCFB3

**I. Sample Holding Times:** Acceptable/All criteria met.

All samples were extracted within the required holding time of 14 days, and analyzed within the required holding time of 40 days. No action taken.

**II. GC/MS Instrument Performance Check:** Acceptable/All criteria met.

DFTPP was analyzed at the beginning of each 12-hour analytical sequence, as required. All DFTPP ion abundance data were provided, and all results were within specified control limits.

**III. Initial and Continuing Calibration:** Acceptable/All criteria met.

All relative response factors (RRF) in the initial calibrations were above the 0.05 lower control limit. All %RSD (Percent Relative Standard Deviations) in initial calibrations were technically acceptable (< 30%) and were calculated correctly. No qualifiers were added to the data based on initial calibrations.

Continuing calibrations were performed at the proper frequency, and all RRF were technically acceptable (> 0.05). The following compound exhibited a percent difference (%D) value greater than the required value of (+/-) 25% in the corresponding sample (BCER7) analysis: 2,4,6-Tribromophenol. 2,4,6-Tribromophenol was qualified "UJ" in the sample.

**IV. Blank Analyses:** Acceptable/All criteria met.

Method blanks were analyzed at the required frequency. No target analytes were detected in the associated method blanks. Qualifiers were not added to the data.

**V. Surrogate Recovery:** Acceptable/All criteria met.

All surrogate spiking compound recoveries were within control limits. No qualifiers were added to the data.

**VI. Matrix Spike/Matrix Spike Duplicate:** Acceptable/All criteria met.

All matrix spike analyses were within control limits. No qualifiers were added due to MS/MSD results.

**VII. Internal Standards Performance:** Acceptable/All criteria met.

Analysis of areas and retention times for internal standards was conducted. All internal standard areas within the technical acceptance window of  $> 100\%$  or  $< 50\%$  of the continuing calibration internal standard area, and all internal retention times were within (  $\pm$  ) 30 seconds of the associated continuing calibration internal standard retention time.

**VIII. System Performance:** Acceptable/All criteria met.

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control limits, and stable during the course of these analyses.

**DATA VALIDATION REPORT  
SEMIVOLATILE ORGANIC COMPOUND ANALYSES  
EPA CLP 3/90 SOW OLM01.9  
Case#: 29839 SDG#: 00005  
Battle Creek, Michigan**

**Samples:**

BCFB01	B1MW1GW5D	BC1MW1GW5	BC1MW3GW5
BCFB02	BC2MW1GW5	BCM1W16GW5	

**I. Sample Holding Times:** Acceptable/All criteria met.

All samples were extracted within the required holding time of 14 days, and analyzed within the required holding time of 40 days. No action taken.

**II. GC/MS Instrument Performance Check:** Acceptable/All criteria met.

DFTPP was analyzed at the beginning of each 12-hour analytical sequence, as required. All DFTPP ion abundance data were provided, and all results were within specified control limits.

**III. Initial and Continuing Calibration:** Acceptable/With the following exceptions.

All relative response factors (RRF) in the initial calibrations were above the 0.05 lower control limit. All %RSD (Percent Relative Standard Deviations) in initial calibrations were technically acceptable (< 30%) and were calculated correctly. No qualifiers were added for initial calibrations.

Continuing calibrations were performed at the proper frequency, and all RRF were technically acceptable (> 0.05). The following analytes exhibited percent difference (%D) values greater than the required value of (+/-) 25% in the corresponding samples' analyses: BCFB01, BCFB02; 2,4-dinitrophenol, 4-nitrophenol, bis(2-ethylhexyl)phthalate, di-n-octylphthalate; BC1MW1GW5, BC1MW3GW5, BCMW4GW5; 2,2'-oxybis(1-chloropropane), 4-chloroaniline, benzo(k)fluoranthene; B1MW1GW5D; bis(2-chlorethyl)ether, N-nitroso-di-n-propylamine, hexachlorobutadiene, 4-nitrophenol, butylbenzylphthalate, bis(2-ethylhexyl)phthalate, di-n-octylphthalate, 4-chloro-2(phenylmethyl)phenol. None of the samples contained detects of these analytes, all associated samples were qualified "UJ".

**IV. Blank Analyses:** Acceptable/All criteria met.

Method blanks were analyzed at the required frequency. No target analytes were detected in the associated method blanks. No qualifiers were added to the data.

**V. Surrogate Recovery:** Acceptable/All criteria met.

All surrogate spiking compound recoveries were within control limits. No qualifiers were added to the data.

**VI. Matrix Spike/Matrix Spike Duplicate:**

NOT PERFORMED.

**VII. Internal Standards Performance:** Acceptable/All criteria met.

Analysis of areas and retention times for internal standards was conducted. All internal standard areas within the technical acceptance window of  $>100\%$  or  $<50\%$  of the continuing calibration internal standard area, and all internal retention times were within  $(+/-)$  30 seconds of the associated continuing calibration internal standard retention time. No qualifiers added.

**VIII. System Performance:** Acceptable/All criteria met.

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control limits, and stable during the course of these analyses.

**DATA VALIDATION REPORT  
SEMIVOLATILE ORGANIC COMPOUND ANALYSES  
EPA CLP 3/90 SOW OLM01.9  
Case#: 29839 SDG#: 00038  
Battle Creek, Michigan**

**Sample:**

BCER02

**I. Sample Holding Times:** Acceptable/All criteria met.

The sample was extracted within the required holding time of 14 days, and analyzed within the required holding time of 40 days. No action taken.

**II. GC/MS Instrument Performance Check:** Acceptable/All criteria met.

DFTPP was analyzed at the beginning of each 12-hour analytical sequence, as required. All DFTPP ion abundance data were provided, and all results were within specified control limits.

**III. Initial and Continuing Calibration:** Acceptable/All criteria met

All relative response factors (RRF) in the initial calibrations were above the 0.05 lower control limit. All %RSD (Percent Relative Standard Deviations) in initial calibrations were technically acceptable (< 30%) and were calculated correctly. No qualifiers were added to the data based on initial calibrations.

Continuing calibrations were performed at the proper frequency, and all RRF were technically acceptable (> 0.05). The following seven analytes exhibited a percent difference (%D) value greater than the required value of (+/-) 25% in the corresponding sample (BCER02) analysis: Pentachlorophenol, 4-nitroaniline, hexachlorobenzene, pyrene, butylbenzylphthalate, bis (2-ethylhexyl) phthalate, and di-n-octylphthalate. The sample contained no detects for these compounds, the compounds were qualified "UJ".

**IV. Blank Analyses:** Acceptable/All criteria met.

Method blanks were analyzed at the required frequency. No target analytes were detected in the associated method blanks. Qualifiers were not added to the data.

**V. Surrogate Recovery:** Acceptable/All criteria met.

All surrogate spiking compound recoveries were within control limits. No qualifiers were added to the data.

**VI. Matrix Spike/Matrix Spike Duplicate:**

NOT PERFORMED.

**VII. Internal Standards Performance:** Acceptable/All criteria met.

Analysis of areas and retention times for internal standards was conducted. All internal standard areas within the technical acceptance window of  $>100\%$  or  $<50\%$  of the continuing calibration internal standard area, and all internal retention times were within ( $\pm$ ) 30 seconds of the associated continuing calibration internal standard retention time. No qualifiers were added to the data.

**VIII. System Performance:** Acceptable/All criteria met.

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control limits, and stable during the course of these analyses.



**DATA VALIDATION REPORT**  
**SEMIVOLATILE ORGANIC COMPOUND ANALYSES**  
**EPA CLP 3/90 SOW OLM01.9**  
**Case#: 29839 SDG#: 00043**  
**Battle Creek, Michigan**

**Samples:**

1MW21012	1MW22022	BC1SS11	BC1SS12
BC1SS13	BC1SS14	BCBG10507	BCBG20507
BCBG30507	BCBG40507	BCBGSS01	BCBGSS02
BCBGSS03	BCBGSS03D	BCBGSS04	BCBGSS04DL
BCBGSS03DL	BCBGSS03DDL		

**I. Sample Holding Times:** Acceptable/All criteria met.

All samples were extracted within the required holding time of 14 days, and analyzed within the required holding time of 40 days. No action taken.

**II. GC/MS Instrument Performance Check:** Acceptable/All criteria met.

DFTPP was analyzed at the beginning of each 12-hour analytical sequence, as required. All DFTPP ion abundance data were provided, and all results were within specified control limits.

**III. Initial and Continuing Calibration:** Acceptable/All criteria met.

All relative response factors (RRF) in the initial calibrations were above the 0.05 lower control limit. All %RSD (Percent Relative Standard Deviations) in initial calibrations were technically acceptable (< 30%) and were calculated correctly.

Continuing calibrations were performed at the proper frequency, and all RRF were technically acceptable (> 0.05). Many analytes were outside the control limit of (+/-) 25% for %difference for several instruments. None of the samples contained detects for any of these analytes, the analytes were qualified "UJ" in the associated samples.

**IV. Blank Analyses:** Acceptable/All criteria met.

Method blanks were analyzed at the required frequency. Target analytes were detected in some associated method blanks, and "B", blank contamination, qualifiers were added to the data as follows:

Sample ID #	Compound	Qualifier
1MW21012	di-n-butylphthalate	B
1MW22022	di-n-butylphthalate	B

**V. Surrogate Recovery:** Acceptable/All criteria met.

All surrogate spiking compound recoveries were within control limits, with the following exceptions: BC1SS12 (PHL high recovery), BCBG20507 (PHL high recovery), and BCBGSS02 (PHL high recovery). No qualifiers were added to the data.

**VI. Matrix Spike/Matrix Spike Duplicate:** Acceptable/All criteria met.

All matrix spike analyses were within control limits, with three exceptions: % Recoveries were high for pyrene in both the spike and duplicate, and %RPDs were outside limits for 1,4-dichlorobenzene and acenaphthene. No qualifiers were added due to MS/MSD results alone.

**VII. Internal Standards Performance:** Acceptable/All criteria met.

Analysis of areas and retention times for internal standards was conducted. All internal standard areas within the technical acceptance window of  $> 100\%$  or  $< 50\%$  of the continuing calibration internal standard area, and all internal retention times were within (  $\pm$  ) 30 seconds of the associated continuing calibration internal standard retention time. No qualifiers added.

**VIII. System Performance:** Acceptable/All criteria met.

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control limits, and stable during the course of these analyses.

**DATA VALIDATION REPORT  
SEMIVOLATILE ORGANIC COMPOUND ANALYSES  
EPA CLP 3/90 SOW OLM01.9  
Case#: 28743 SDG#: 00064  
Battle Creek, Michigan**

**Samples:**

BCMW9GW4	BC2MW1GW4	BCMW5GW4	BCMW6GW4
BC3MW2GW4	BCER3	BCMW15GW4	BCMW8GW4
BCMW7GW4	BCER4		

**I. Sample Holding Times:** Acceptable/All criteria met.

All samples were extracted within the required holding time of 14 days, and analyzed within the required holding time of 40 days. No action taken.

**II. GC/MS Instrument Performance Check:** Acceptable/All criteria met.

DFTPP was analyzed at the beginning of each 12-hour analytical sequence, as required. All DFTPP ion abundance data were provided, and all results were within specified control limits.

**III. Initial and Continuing Calibration:** Acceptable/All criteria met.

All relative response factors (RRF) in the initial calibrations were above the 0.05 lower control limit. All %RSD (Percent Relative Standard Deviations) in initial calibrations were technically acceptable (< 30%) and were calculated correctly, with one exception: Benzoic acid was found to be outside control limits for %RSD. One sample ( BCMW9GW4 ) was found to contain benzoic acid, and the data was qualified "J", estimated. No other qualifiers were added due to initial calibrations.

Continuing calibrations were performed at the proper frequency, and all RRF were technically acceptable (> 0.05). The following analytes exhibited percent difference (%D) values greater than the required value of (+/-) 25% in the corresponding samples' analyses: Samples BCMW15GW4, BCMW7GW4, BCER3, BCER4, and BCMW8GW4; benzo(g,h,i)perylene. Samples BCMW5GW4, BCMW6GW4, BC2MW1GW4, and BCMW9GW4; benzoic acid and bis (2-ethylhexyl) phthalate. None of the samples contained detects for these analytes, the associated analytes were qualified "UJ".

**IV. Blank Analyses:** Acceptable/All criteria met.

Method blanks were analyzed at the required frequency. Target analytes were detected in the associated method blanks. Qualifiers were added to the data as follows:

Sample ID #	Compound	Qualifier
BCMW9GW4	di-n-butyl phthalate	B
	bis(2-ethylhexyl) phthalate	B
BC2MW1GW4	di-n-butyl phthalate	B
	bis(2-ethylhexyl) phthalate	B

Sample ID #	Compound	Qualifier
BC3MW2GW4	di-n-butyl phthalate	B
	bis(2-ethylhexyl) phthalate	B
BCMW5GW4	di-n-butyl phthalate	B
	bis(2-ethylhexyl) phthalate	B
BCMW6GW4	di-n-butyl phthalate	B
	bis(2-ethylhexyl) phthalate	B

**V. Surrogate Recovery:** Acceptable/All criteria met.

All surrogate spiking compound recoveries were within control limits. No qualifiers were added to the data.

**VI. Matrix Spike/Matrix Spike Duplicate:** Acceptable/All criteria met.

All matrix spike analyses were within control limits. No qualifiers were added due to MS/MSD results alone.

**VII. Internal Standards Performance:** Acceptable/All criteria met.

Analysis of areas and retention times for internal standards was conducted. All internal standard areas within the technical acceptance window of >100% or <50% of the continuing calibration internal standard area, and all internal retention times were within (+/-) 30 seconds of the associated continuing calibration internal standard retention time. No qualifiers added.

**VIII. System Performance:** Acceptable.

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control limits, and stable during the course of these analyses.

**DATA VALIDATION REPORT  
SEMIVOLATILE ORGANIC COMPOUND ANALYSES  
EPA CLP 3/90 SOW OLM01.9  
Case#: 29588 SDG#: 00082  
Battle Creek, Michigan**

**Samples:**

B1B110001	B1B111923	B1B11923D	B1B181517
B1B190001	B1B192022	BC1B70001	BC1B71012
BC1B90001			

**I. Sample Holding Times:** Acceptable/All criteria met.

All samples were extracted within the required holding time of 14 days, and analyzed within the required holding time of 40 days. No action taken.

**II. GC/MS Instrument Performance Check:** Acceptable/All criteria met.

DFTPP was analyzed at the beginning of each 12-hour analytical sequence, as required. All DFTPP ion abundance data were provided, and all results were within specified control limits.

**III. Initial and Continuing Calibration:** Acceptable/All criteria met.

All relative response factors (RRF) in the initial calibrations were above the 0.05 lower control limit. All %RSD (Percent Relative Standard Deviations) in initial calibrations were technically acceptable (< 30%) and were calculated correctly, with one exception: all initial calibrations were outside control limits for one compound, 2,4-dinitrophenol. No detects were reported for 2,4-dinitrophenol, and no qualifiers were added to the data.

Continuing calibrations were performed at the proper frequency, and all RRF were technically acceptable (>0.05). One compound exhibited a percent difference (%D) value greater than the required value of (+/-) 25% in the corresponding samples' analyses: 4-nitrophenol. None of the samples contained detects for 4-nitrophenol, 4-nitrophenol was qualified "UJ" in the associated samples.

**Blank Analyses:** Acceptable/All criteria met.

Method blanks were analyzed at the required frequency. No target analytes were detected in the associated method blanks. Qualifiers were not added to the data.

**V. Surrogate Recovery:** Acceptable/All criteria met.

All surrogate spiking compound recoveries were within control limits. No qualifiers were added to the data.

**VI. Matrix Spike/Matrix Spike Duplicate:** Acceptable/All criteria met.

All matrix spike analyses were within control limits, with the following exceptions: phenol, 4-nitrophenol, and 2,4-dinitrotoluene all exhibited %recoveries above the upper control limits. No detects were reported for any of these analytes, and no qualifiers were added due to MS/MSD results alone.

**VII. Internal Standards Performance:** Acceptable/All criteria met.

Analysis of areas and retention times for internal standards was conducted. All internal standard areas within the technical acceptance window of  $>100\%$  or  $<50\%$  of the continuing calibration internal standard area, and all internal retention times were within  $(+/-)$  30 seconds of the associated continuing calibration internal standard retention time.

**VIII. System Performance:** Acceptable/All criteria met.

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control limits, and stable during the course of these analyses.

**DATA VALIDATION REPORT  
SEMIVOLATILE ORGANIC COMPOUND ANALYSES  
EPA CLP SOW 3/90 OLM01.9  
Case#: 500639 SDG#: 03  
Battle Creek, Michigan**

**Samples:**

BCMW1GW4	BCMW2GW4	BCMW16GW4	BCMW3GW4
BCMW13GW4	C3MW17GW4	BCFB2	BCMW14GW4
BC3MW6GW4	BCMW11GW4	BC3MW4GW4	BCER2
BC3MW3GW4	BC3MW5GW4	BCMW12GW4	BC3MW1GW4
BCMW4GW4	BCMW18GW4	BC3MW3GW4RE	BCFB1
BCMW11GW4RE	BCER1		

**I. Sample Holding Times:** Acceptable/All criteria met.

All samples were extracted within the required holding time of 14 days, and analyzed within the required holding time of 40 days, with two exceptions: repeated analysis of BC3MW3GW4 (BC3MW3GW4RE) and BCMW11GW4 (BCMW11GW4) took place outside of required holding times. All nondetects in these samples were qualified "UJ", not detected, estimated, and all detects were qualified "J", estimated.

**II. GC/MS Instrument Performance Check:** Acceptable/All criteria met.

DFTPP was analyzed at the beginning of each 12-hour analytical sequence, as required. All DFTPP ion abundance data were provided, and all results were within specified control limits.

**III. Initial and Continuing Calibration:** Acceptable/All criteria were met.

All relative response factors (RRF) in the initial calibrations were above the 0.05 lower control limit. All %RSD (Percent Relative Standard Deviations) in initial calibrations were technically acceptable (< 30%) and were calculated correctly.

Continuing calibrations were performed at the proper frequency, and all RRF were technically acceptable (> 0.05). The following analytes exhibited percent difference (%D) values greater than the required value of (+/-) 25% in the corresponding samples' analyses: Samples BCER1, BCFB1, BCFB2, BCMW1GW4; bis (2-chloroisopropyl) ether, benzoic acid, 4-chloroaniline, 2-nitroaniline, benzo(k)fluoranthene, and benzo (g,h,i) perylene. Samples BCER2, BCMW16GW4, BCMW3GW4, BCMW11GW4, BCMW12GW4, BCMW13GW4, BC3MW4GW4, BC3MW5GW4, BC3MW6GW4, BCMW2GW4, BC3MW1GW4, BC3MW3GW4; benzoic acid, 2-nitroaniline, butylbenzylphthalate, and benzo (k) fluoranthene. Samples BC3MW3GW4RE, BCMW12GW4RE; benzoic acid. Samples BCMW14GW4, BCMW18GW4, BCMW4GW4; benzoic acid and bis (2-chlorethoxy) methane. Detected concentrations of these analytes were qualified "J", estimated, and nondetects were qualified "UJ".

**IV. Blank Analyses:** Acceptable/All criteria were met.

Method blanks were analyzed at the required frequency. Several analytes were detected in method blanks associated with the environmental samples, and "B", blank contamination, qualifiers were added to the data as follows:

Sample ID #	Compound	Qualifier
BC3MW4GW4	di-n-butylphthalate	B
	bis(2-ethylhexyl)phthalate	B
BC3MW3GW4	di-n-butylphthalate	B
	bis(2-ethylhexyl)phthalate	B
BC3MW6GW4	di-n-butylphthalate	B
	bis(2-ethylhexyl)phthalate	B
BCMW11GW4	di-n-butylphthalate	B
	bis(2-ethylhexyl)phthalate	B
BCMW12GW4	di-n-butylphthalate	B
BCMW13GW4	di-n-butylphthalate	B
BCMW14GW4	bis(2-ethylhexyl)phthalate	B
	di-n-butylphthalate	B
BCMW16GW4	di-n-butylphthalate	B
BCER1	di-n-butylphthalate	B
BCER2	bis(2-ethylhexyl)phthalate	B
	di-n-butylphthalate	B
BCFB1	di-n-butylphthalate	B
BCFB2	di-n-butylphthalate	B
BCMW1GW4	di-n-butylphthalate	B
BCMW2GW4	bis(2-ethylhexyl)phthalate	B
	di-n-butylphthalate	B
BC3MW1GW4	bis(2-ethylhexyl)phthalate	B
	di-n-butylphthalate	B
BC3MW3GW4	bis(2-ethylhexyl)phthalate	B
	di-n-butylphthalate	B
BCMW18GW4	bis(2-ethylhexyl)phthalate	B
	di-n-butylphthalate	B
BCMW3GW4	di-n-butylphthalate	B
BCMW4GW4	bis(2-ethylhexyl)phthalate	B
	di-n-butylphthalate	B
BC3MW17GW4	di-n-butylphthalate	B



**V. Surrogate Recovery:** Acceptable/All criteria were met.

All surrogate spiking compound recoveries were within control limits, with the following exceptions: Samples BC3MW3GW4RE, BCMW11GW4, and BCMW11GW4RE reported multiple surrogate recoveries outside control limits. Data were qualified as follows:

Sample ID #	Compound	Qualifier
BC3MW3GW4RE	phenol	R
	2-chlorophenol	R
	2-methylphenol	R
	4-methylphenol	R
	2-nitrophenol	R
	2,4-dimethylphenol	R
	2,4-dichlorophenol	R
	4-chloro-3-methylphenol	R
	2,4,6-trichlorophenol	R
	2,4,5-trichlorophenol	R
	2,4-dinitrophenol	R
	4-nitrophenol	R
	4,6-dinitro-2-methylphenol	R
	pentachlorophenol	R
	di-n-butylphthalate	J
	bis(2-ethylhexyl)phthalate	J
BCMW11GW4RE	phenol	R
	2-chlorophenol	R
	2-methylphenol	R
	4-methylphenol	R
	2-nitrophenol	R
	2,4-dimethylphenol	R
	2,4-dichlorophenol	R
	4-chloro-3-methylphenol	R
	2,4,6-trichlorophenol	R
	2,4,5-trichlorophenol	R
	2,4-dinitrophenol	R
	4-nitrophenol	R
	4,6-dinitro-2-methylphenol	R
	pentachlorophenol	R
	di-n-butylphthalate	J
	bis(2-ethylhexyl)phthalate	J
BCMW11GW4	phenol	R

Sample ID #	Compound	Qualifier
	2-chlorophenol	R
	2-methylphenol	R
	4-methylphenol	R
	2-nitrophenol	R
	2,4-dimethylphenol	R
	2,4-dichlorophenol	R
	4-chloro-3-methylphenol	R
	2,4,6-trichlorophenol	R
	2,4,5-trichlorophenol	R
	2,4-dinitrophenol	R
	4-nitrophenol	R
	4,6-dinitro-2-methylphenol	R
	pentachlorophenol	R

**VI. Matrix Spike/Matrix Spike Duplicate:** Acceptable/All criteria were met.

All matrix spike analyses were within control limits. No qualifiers were added due to MS/MSD results alone.

**VII. Internal Standards Performance:** Acceptable/All criteria were met.

Analysis of areas and retention times for internal standards was conducted. All internal standard areas within the technical acceptance window of >100% or <50% of the continuing calibration internal standard area, and all internal retention times were within ( + / - ) 30 seconds of the associated continuing calibration internal standard retention time. No qualifiers added.

**VIII. System Performance:** Acceptable/All criteria were met.

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control limits, and stable during the course of these analyses.

**DATA VALIDATION REPORT  
SEMIVOLATILE ORGANIC COMPOUND ANALYSES  
EPA CLP SOW 3/90 OLM01.9  
Case#: 29588 SDG#: 00006  
Battle Creek, Michigan**

**Samples:**

BC1B10001	BC1B10507	BC1B12022	BC1B20001
BC1B21012	BC1B22022	BC1B30001	BC1B32022
BC1B40001	BC1B41012	BC1B51012	BC1B52022
BC1B82022	B1B10001D	B1B151012	B1B122022
B1B120001	B1B50001	B1B50001D	B1B80001

**I. Sample Holding Times:** Acceptable/All criteria met.

All samples were extracted within the required holding time of 14 days, and analyzed within the required holding time of 40 days. No action taken.

**II. GC/MS Instrument Performance Check:** Acceptable/All criteria met.

DFTPP was analyzed at the beginning of each 12-hour analytical sequence, as required. All DFTPP ion abundance data were provided, and all results were within specified control limits.

**III. Initial and Continuing Calibration:** Acceptable/All criteria met.

All relative response factors (RRF) in the initial calibrations were above the 0.05 lower control limit. All %RSD (Percent Relative Standard Deviations) in initial calibrations were technically acceptable (< 30%) and were calculated correctly, with one exception: 2,4-dinitrophenol was found to be outside control limits for %RSD in the following samples: B1B151012, BC1B32022, and BC1B51012. No detects were reported for 2,4-dinitrophenol, and no qualifiers were added due %RSD less than 50%.

Continuing calibrations were performed at the proper frequency, and all RRF were technically acceptable (> 0.05). The following calibrations exhibited percent difference (%D) values greater than the required value of (+/-) 25% in the corresponding samples' analyses: B1B120001, B1B50001, B1B50001d, B1B80001, and BC1B40001: 4-nitrophenol; BC1B2022: 2,4-dinitrophenol, 2,2'-oxybis (1-chloropropane). None of the samples contained detects of these analytes, associated non-detects were qualified "UJ".

**IV. Blank Analyses:** Acceptable/All criteria met.

No compound sought in any environmental sample was detected in any method blank. No qualifiers were added to the data based on method blank contamination.

**V. Surrogate Recovery:** Acceptable/All criteria met.

All surrogate spiking compound recoveries were within control limits. No qualifiers were added to the data.

**VI. Matrix Spike/Matrix Spike Duplicate:** Acceptable/All criteria met.

All matrix spike analyses were within control limits. No detects were reported for phenol, and no qualifiers were added due to MS/MSD results alone.

**VII. Internal Standards Performance:** Acceptable/All criteria met.

Analysis of areas and retention times for internal standards was conducted. All internal standard areas within the technical acceptance window of  $>100\%$  or  $<50\%$  of the continuing calibration internal standard area, and all internal retention times were within ( $\pm$ ) 30 seconds of the associated continuing calibration internal standard retention time. No qualifiers added.

**VIII. System Performance:** No qualifiers added.

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control limits, and stable during the course of these analyses.

**DATA VALIDATION REPORT  
VOLATILE ORGANIC COMPOUND ANALYSES  
EPA SW-846 8010/8020  
CASE#: 29588 SDG#: 00001  
Battle Creek, Michigan**

**Samples:**

BCFB3                      BCTB1

**I. Sample Holding Times:** Acceptable/All criteria were met.

All samples were initially analyzed within the required holding time of 14 days for preserved water samples. All samples were analyzed within 14 days of sampling. No action taken.

**II. Initial and Continuing Calibration:** Acceptable/With the following exceptions: Relative response factors (RRF) and percent relative standard deviations (%RSD) in initial calibrations were technically acceptable and calculated correctly. Continuing calibrations were performed at the proper frequency, and all RRF were technically acceptable.

Many analytes were found to be outside control limits in continuing calibrations, the analytes were not detected. Non-detects were qualified "UJ".

**III. Blank Analyses:** Acceptable/With the following exceptions:

Method blank analysis indicated several analytes were present in the method blanks associated with the samples. Analytes detected in the samples were qualified "B", blank contamination, according to the 5x/10x rule, as detailed below:

Sample ID #	Compound	Qualifier
BCTB1	methylene chloride	B
	p-xylene	B
	m-xylene	B
	1,2-dichlorobenzene	B
BCFB3	methylene chloride	B
	p-xylene	B
	m-xylene	B
	1,4-dichlorobenzene	B

**IV. Surrogate Recovery:** Acceptable/All criteria met.

All surrogate spiking analytes recoveries were within control limits. No qualifiers were required.

V. **Matrix Spike/Matrix Spike Duplicate:** Acceptable/All criteria met.

All Matrix Spike/Matrix Spike Duplicate results were acceptable. No qualifiers required.

VI. **System Performance:** Acceptable/All criteria met.

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control, and stable during the course of these analyses.

**DATA VALIDATION REPORT**  
**VOLATILE ORGANIC COMPOUND ANALYSES**  
**EPA SW-846 8240**  
**Case: 29588 SDG: 00009**  
**Battle Creek, Michigan**

**Samples:**

B1B10001D	B1B120001	B1B122022	B1B151012
B1B150001D	B1B80001	BC1B10001	BC1B10507
BC1B12022	BC1B20001	BC1B21012	BC1B22022
BC1B30001	BC1B32022	BC1B40001	BC1B41012
BC1B50001	BC1B51012	BC1B52022	BC1B82022

**I. Sample Holding Times:** Acceptable/All criteria were met

All samples were analyzed within the required time of 14 days. No qualifiers were added to the data.

**II. GC/MS Instrument Performance Check:** Acceptable/All criteria were met.

Bromofluorobenzene (BFB) was analyzed at the beginning of each 12-hour analytical sequence, as required. All BFB ion abundance data were provided, and all results fell within allowable limits.

**III. Initial and Continuing Calibration:** Acceptable/With the following exceptions.

Relative response factors (RRF) and percent relative standard deviations (%RSD) in initial calibrations were technically acceptable and calculated correctly, with the following exceptions: Two analytes were found to be outside control limits for %difference: methylene chloride and acetone. Neither analyte was detected in any of the environmental samples, qualifiers were not added to the data since the %differences were less than 50%.

Continuing calibration was performed at the proper frequency, and all RRF were technically acceptable. Several analytes indicated %difference outside control limits. None of the analytes were detected in any of the environmental samples, the analytes were qualified "UJ" in associated samples.

**IV. Blank Analyses:** Acceptable/With the following exceptions.

Method blanks were analyzed at the required frequency. Several common contaminants were detected in the associated method blanks. "B", blank contamination, qualifiers were added to the data as a result of method blank contamination:

Sample ID #	Compound	Qualifier
B1B10001D	methylene chloride	B
	acetone	B
B1B120001	methylene chloride	B
	acetone	B

Sample ID #	Compound	Qualifier
B1B122022	methylene chloride	B
	acetone	B
B1B151012	methylene chloride	B
	acetone	B
B1B150001D	methylene chloride	B
B1B80001	methylene chloride	B
BC1B10001	methylene chloride	B
	acetone	B
BC1B10507	methylene chloride	B
BC1B12022	methylene chloride	B
	acetone	B
BC1B20001	methylene chloride	B
BC1B21012	methylene chloride	B
BC1B22022	methylene chloride	B
	acetone	B
BC1B30001	methylene chloride	B
BC1B32022	methylene chloride	B
	acetone	B
BC1B40001	methylene chloride	B
	acetone	B
BC1B41012	methylene chloride	B
BC1B50001	methylene chloride	B
	acetone	B
BC1B51012	methylene chloride	B
	acetone	B
BC1B52022	methylene chloride	B
	acetone	B
BC1B82022	methylene chloride	B
	acetone	B

**V. Surrogate Recovery:** Acceptable/All Criteria Met

All surrogate spiking analytes recoveries were within control limits. No qualifiers were added to the data.



**VI. Matrix Spike/Matrix Spike Duplicate: Acceptable/All Criteria Met**

All Matrix Spike and Matrix Spike Duplicate results were found to be within control limits. No qualifiers were added to the data.

**VII. Internal Standards Performance: Acceptable/All criteria met.**

All internal standard area counts were within the technical acceptance window of + 100% or -50%, and all internal retention times were within plus or minus 30 seconds of the associated continuing calibration internal standard retention time. No qualifiers were added to the data.

**VIII. System Performance: Acceptable/All criteria met.**

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control, and stable during the course of these analyses.

**DATA VALIDATION REPORT**  
**VOLATILE ORGANIC COMPOUND ANALYSES**  
**EPA SW-846 8240**  
**Case: 29839 SDG: 00011**  
**Battle Creek, Michigan**

**Samples:**

1MW22022                      1MW21012

**I.        Sample Holding Times:** Acceptable/All criteria were met

All samples were analyzed within the required time of 14 days. No qualifiers were added to the data.

**II.       GC/MS Instrument Performance Check:** Acceptable/All criteria were met.

Bromofluorobenzene (BFB) was analyzed at the beginning of each 12-hour analytical sequence, as required. All BFB ion abundance data were provided, and all results fell within allowable limits.

**III.      Initial and Continuing Calibration:** Acceptable/All criteria were met.

Relative response factors (RRF) and percent relative standard deviations (%RSD) in initial calibrations were technically acceptable and calculated correctly, with two exceptions: acetone and methylene chloride were found to be outside control limits for %RSD. Acetone was qualified "J" in sample 1MW21012, acetone was qualified "UJ" in 1MW22022. Methylene chloride was previously qualified "B", blank contamination, for both samples.

Continuing calibration was performed at the proper frequency, and all RRF were technically acceptable. Three analytes indicated %difference outside control limits. No detects were reported for these analytes, the analytes were qualified "UJ" in the samples.

**IV.      Blank Analyses:** Acceptable/All criteria were met.

Method blanks were analyzed at the required frequency. Water sample method blanks did not indicate any baseline blank contamination, with one exception: methylene chloride. "B", blank contamination, qualifiers were added to each detect as a result of method blank contamination.

Sample ID #	Compound	Qualifier
1MW22022	methylene chloride	B
1MW21012	methylene chloride	B

**V. Surrogate Recovery:** Acceptable/All criteria were met.

All surrogate spiking analytes recoveries were within control limits. No qualifiers were added to the data.

**VI. Matrix Spike/Matrix Spike Duplicate:** Acceptable/All criteria were met.

Matrix Spike analysis results were all within control limits. No qualifiers were added to the data.

**VII. Internal Standards Performance:** Acceptable/All criteria were met.

All internal standard area counts were within the technical acceptance window of + 100% or -50%, and all internal retention times were within plus or minus 30 seconds of the associated continuing calibration internal standard retention time. No qualifiers were added to the data.

**VIII. System Performance:** Acceptable/All criteria were met.

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control, and stable during the course of these analyses.

**DATA VALIDATION REPORT**  
**VOLATILE ORGANIC COMPOUND ANALYSES**  
**EPA SW-846 8240**  
**Case: 29839 SDG: 00036**  
**Battle Creek, Michigan**

**Samples:**

BCTB3          BCER02

**I. Sample Holding Times:** Acceptable/All criteria were met

All samples were analyzed within the required time of 14 days. No qualifiers were added to the data.

**II. GC/MS Instrument Performance Check:** Acceptable/All criteria were met.

Bromofluorobenzene (BFB) was analyzed at the beginning of the 12-hour analytical sequence, as required. All BFB ion abundance data were provided, and all results fell within allowable limits.

**III. Initial and Continuing Calibration:** Acceptable/All criteria were met.

Relative response factors (RRF) and percent relative standard deviations (%RSD) in initial calibration were technically acceptable and calculated correctly. No qualifiers were added to the data for initial calibration.

Continuing calibration was performed at the proper frequency, and all RRF were technically acceptable. Four analytes indicated %difference outside control limits: 1,1,1-TCA, carbon tetrachloride, bromodichloromethane, and 4-methyl-2-pentanone. No detects were reported for the analytes, the analytes were qualified "UJ" in the associated samples.

**IV. Blank Analyses:** Acceptable/All criteria were met.

Method blanks were analyzed at the required frequency. Water sample method blanks did not indicate any baseline blank contamination, with one exception: methylene chloride. "B", blank contamination, qualifiers were added to the data for both samples as a result of method blank contamination by methylene chloride.

Sample ID #	Compound	Qualifier
BCTB3	methylene chloride	B
BCER02	methylene chloride	B

**V. Surrogate Recovery:** Acceptable/All criteria were met.

All surrogate spiking analytes recoveries were within control limits. No qualifiers were added to the data.

**VI. Matrix Spike/Matrix Spike Duplicate:**

NOT PERFORMED.

**VII. Internal Standards Performance:** Acceptable/All criteria were met.

All internal standard area counts were within the technical acceptance window of + 100% or -50%, and all internal retention times were within plus or minus 30 seconds of the associated continuing calibration internal standard retention time. No qualifiers were added to the data.

**VIII. System Performance:** Acceptable/All criteria were met.

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control, and stable during the course of these analyses.

**DATA VALIDATION REPORT**  
**VOLATILE ORGANIC COMPOUND ANALYSES**  
EPA SW-846 8010/8020  
CASE#: 29588 SDG#: 00049  
Battle Creek, Michigan

**Samples:**

BCFB6	BCER6	BCTB3	BCER5
BCTB2	BCTB4	BCER7	

**I. Sample Holding Times:** Acceptable/All criteria were met.

All samples were initially analyzed within the required holding time of 14 days for preserved water samples. No action taken.

**II. Initial and Continuing Calibration:** Acceptable/With the following exceptions: Relative response factors (RRF) and percent relative standard deviations (%RSD) in initial calibrations were technically acceptable and calculated correctly. Continuing calibrations were performed at the proper frequency, and all RRF were technically acceptable. Several analytes reported %differences outside acceptable ranges. All associated sample detects were qualified "J", non-detects were qualified "UJ".

**III. Blank Analyses:** Acceptable/With the following exception

Method blank analysis indicated several analytes were present in the method blanks associated with the samples. Analytes detected in the samples were qualified "B", blank contamination, according to the 5x/10x rule, as detailed below:

Sample ID #	Compound	Qualifier
BCER5	methylene chloride	B
BCER6	methylene chloride	B
BCER7	methylene chloride	B
BCFB6	methylene chloride	B
	chloromethane	B
	chloroform	B
	tetrachloroethene	B
	ethylbenzene	B
	p-xylene	B
	m-xylene	B
	1,4-dichlorobenzene	B
	1,2-dichlorobenzene	B
BCTB2	methylene chloride	B
	chloroform	B

Sample ID #	Compound	Qualifier
BCTB3	methylene chloride	B
	chloroform	B
BCTB4	methylene chloride	B
	chloroform	B

**IV. Surrogate Recovery:** Acceptable/All criteria were met.

All surrogate spiking analytes recoveries were within control limits. No qualifiers were required.

**V. Matrix Spike/Matrix Spike Duplicate:**

NOT PERFORMED.

**VI. System Performance:** Acceptable/All criteria were met.

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control, and stable during the course of these analyses.

**DATA VALIDATION REPORT**  
**VOLATILE ORGANIC COMPOUND ANALYSES**  
**EPA SW-846 8240**  
**Case: 29839 SDG: 00050**  
**Battle Creek, Michigan**

**Samples:**

BCBG10507	BCBG20507	BCBG30507	BCBG40507
BCBGSS01	BCBGSS02	BCBGSS03	BCBGSS04

**I. Sample Holding Times:** Acceptable/All criteria were met.

All samples were analyzed within the required time of 14 days. No qualifiers were added to the data.

**II. GC/MS Instrument Performance Check:** Acceptable/All criteria were met.

Bromofluorobenzene (BFB) was analyzed at the beginning of each 12-hour analytical sequence, as required. All BFB ion abundance data were provided, and all results fell within allowable limits.

**III. Initial and Continuing Calibration:** Acceptable/All criteria were met.

Relative response factors (RRF) and percent relative standard deviations (%RSD) in initial calibrations were technically acceptable and calculated correctly, with two exceptions: acetone and methylene chloride were found to be outside control limits for %RSD. All detects for methylene chloride and acetone were qualified "J", methylene chloride and acetone were detected in all samples.

Continuing calibration was performed at the proper frequency, and all RRF were technically acceptable. All %differences were within control limits, and no qualifiers were added to the data.

**IV. Blank Analyses:** Acceptable/All criteria were met.

Method blanks were analyzed at the required frequency. Methylene chloride and acetone were detected in the associated blanks, and "B", blank contamination, qualifiers were added to the data as a result of method blank contamination:

Sample ID #	Compound	Qualifier
BCBG10507	methylene chloride	B
	acetone	B
BCBG20507	methylene chloride	B
BCBG30507	methylene chloride	B
	acetone	B
BCBG40507	methylene chloride	B
	acetone	B



Sample ID #	Compound	Qualifier
BCBGSS01	methylene chloride	B
BCBGSS02	methylene chloride	B
BCBGSS03	methylene chloride	B
BCBGSS03D	methylene chloride	B
	acetone	B
BCBGSS04	methylene chloride	B

**V. Surrogate Recovery:** Acceptable/All criteria were met.

All surrogate spiking analytes recoveries were within control limits. No qualifiers were added to the data.

**VI. Matrix Spike/Matrix Spike Duplicate:** Acceptable/All criteria were met.

One compound was found to be outside control limits for %RPD: Trichloroethene. No qualifiers were added to the data, as all detects were qualified "B", blank contamination previously.

**VII. Internal Standards Performance:** Acceptable/All criteria were met.

All internal standard area counts were within the technical acceptance window of + 100% or -50%, and all internal retention times were within plus or minus 30 seconds of the associated continuing calibration internal standard retention time. No qualifiers were added to the data.

**VIII. System Performance:** Acceptable/All criteria were met.

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control, and stable during the course of these analyses.

**DATA VALIDATION REPORT**  
**VOLATILE ORGANIC COMPOUND ANALYSES**  
**EPA SW-846 8240**  
**Case: 29588 SDG: 00095**  
**Battle Creek, Michigan**

**Samples:**

B1B110001	B1B190001	BC1B70001	BC1B90001
B1B111923	B1B11923D	B1B192022	BC1B71012
B1B181517			

**I. Sample Holding Times:** Acceptable/All criteria were met

All samples were analyzed within the required time of 14 days. No qualifiers were added to the data.

**II. GC/MS Instrument Performance Check:** Acceptable/All criteria were met.

Bromofluorobenzene (BFB) was analyzed at the beginning of each 12-hour analytical sequence, as required. All BFB ion abundance data were provided, and all results fell within allowable limits.

**III. Initial and Continuing Calibration:** Acceptable/All criteria were met.

Relative response factors (RRF) and percent relative standard deviations (%RSD) in initial calibrations were technically acceptable and calculated correctly, with two exceptions: acetone and methylene chloride were found to be outside control limits for %RSD. All detects for both analytes were qualified "J", acetone and methylene chloride were detected in all samples.

Continuing calibration was performed at the proper frequency, and all RRF were technically acceptable. Many analytes indicated %differences outside control limits. None of the analytes were detected in any sample, the analytes were qualified "UJ" in the associated samples.

**IV. Blank Analyses:** Acceptable.

Method blanks were analyzed at the required frequency. Method blank analysis indicated the presence of two analytes in each blank: methylene chloride and acetone. "B", blank contamination qualifiers were added to the data as a result of method blank contamination:

Sample ID #	Compound	Qualifier
B1B110001	methylene chloride	B
	acetone	B
B1B190001	methylene chloride	B
	acetone	B
BC1B70001	methylene chloride	B

Sample ID #	Compound	Qualifier
BC1B90001	methylene chloride	B
B1B111923	methylene chloride	B
	acetone	B
B1B11923D	methylene chloride	B
	acetone	B
B1B192022	methylene chloride	B
	acetone	B
BC1B71012	methylene chloride	B
B1B181517	methylene chloride	B
	acetone	B

**V. Surrogate Recovery:** Acceptable/All criteria were met.

All surrogate spiking analytes recoveries were within control limits. No qualifiers were added to the data.

**VI. Matrix Spike/Matrix Spike Duplicate:** Acceptable/All criteria were met.

All matrix spike and matrix spike duplicate results were within control limits. No qualifiers were added to the data.

**VII. Internal Standards Performance:** Acceptable/All criteria were met.

All internal standard area counts were within the technical acceptance window of + 100% or -50%, and all internal retention times were within plus or minus 30 seconds of the associated continuing calibration internal standard retention time. No qualifiers were added to the data.

**VIII. System Performance:** Acceptable

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control, and stable during the course of these analyses.

**DATA VALIDATION REPORT**  
**VOLATILE ORGANIC COMPOUND ANALYSES**  
**EPA SW-846 8010/8020**  
**CASE#: 28743 SDG#: 455**  
**Battle Creek, Michigan**

**Samples:**

BCMW1GW4	BCMW2GW4	BC3MW4GW4	BCMW13GW4
BC3MW17GW4	BC3MW6GW4	BCMW3GW4	BC3MW3GW4
BC3MW5GW4	BCMW18GW4	BCMW4GW4	BCTB1
BCTB4	BCER2	BCER1	BCMW11GW4
BCMW12GW4	BCMW16GW4	BC3MW1GW4	BCFB1

**I. Sample Holding Times:** Acceptable/All criteria were met.

All samples were initially analyzed within the required holding time of 14 days for preserved water samples. Confirmation analyses took place within required holding times. No qualifiers were added to the data.

**II. Initial and Continuing Calibration:** Acceptable/With the following exceptions:

Relative response factors (RRF) and percent relative standard deviations (%RSD) in initial calibrations were technically acceptable and calculated correctly. Continuing calibrations were performed at the proper frequency, and all RRF were technically acceptable. Several analytes reported %differences exceeding criteria. All associated sample detects were qualified "J", all non-detects were qualified "UJ".

**III. Blank Analyses:** Acceptable/With the following exceptions:

Method blank analysis indicated several analytes were present in the method blanks associated with the samples. Analytes detected in the samples were qualified "B", blank contamination, according to the 5x/10x rule, as detailed below:

Sample ID #	Compound	Qualifier
BCTB1	methylene chloride	B
BCMW1GW4	methylene chloride	B
BCMW2GW4	methylene chloride	B
BCFB1	methylene chloride	B
	ethylbenzene	B
	1,3-dichlorobenzene	B
	1,2-dichlorobenzene	B
	1,4-dichlorobenzene	B
BCMW16GW4	methylene chloride	B

Sample ID #	Compound	Qualifier
BC3MW4GW4	methylene chloride	B
	styrene	B
	1,4-dichlorobenzene	B
BCMw13GW4	methylene chloride	B
	toluene	B
	1,4-dichlorobenzene	B
BCER1	methylene chloride	B
	ethylbenzene	B
	1,3-dichlorobenzene	B
	1,4-dichlorobenzene	B
BC3MW17GW4	methylene chloride	B
	toluene	B
	p-xylene	B
	m-xylene	B
	1,4-dichlorobenzene	B
	1,2-dichlorobenzene	B
BC3MW6GW4	ethylbenzene	B
	p-xylene	B
	m-xylene	B
	1,3-dichlorobenzene	B
	1,4-dichlorobenzene	B
BCMw11GW4	methylene chloride	B
	1,4-dichlorobenzene	B
BCMw3GW4	methylene chloride	B
BCER2	methylene chloride	B
	ethylbenzene	B
	styrene	B
	1,3-dichlorobenzene	B
	1,4-dichlorobenzene	B
BC3MW3GW4	methylene chloride	B
BC3MW5GW4	methylene chloride	B
	benzene	B
	toluene	B
	ethylbenzene	B
BCMw12GW4	methylene chloride	B
	toluene	B
BC3MW1GW4	1,4-dichlorobenzene	B

Sample ID #	Compound	Qualifier
BCMW4GW4	methylene chloride	B
	benzene	B
	1,3-dichlorobenzene	B
	1,4-dichlorobenzene	B

**IV. Surrogate Recovery:** Acceptable/All criteria were met.

All surrogate spiking analytes recoveries were within control limits. No qualifiers were added to the data.

**V. Matrix Spike/Matrix Spike Duplicate:** Acceptable/All criteria were met.

All Matrix Spike/Matrix Spike Duplicate results were within control limits. No qualifiers were added to the data.

**VI. System Performance:** Acceptable/All criteria were met.

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control, and stable during the course of these analyses.

**DATA VALIDATION REPORT**  
**VOLATILE ORGANIC COMPOUND ANALYSES**  
EPA SW-846 / 8010/8020  
CASE#: 28743 SDG#: 456  
Battle Creek, Michigan

**Samples:**

BCMW9GW4	BCMW14GW4	BC2MW1GW4	BCMW5GW4
BC3MW2GW4	BCMW15GW4	BCMW8GW4	BCMW7GW4
BCTB5	BCTB6	BCER3	BCER4
BCFB2	BCMW6GW4		

**I. Sample Holding Times:** Acceptable/All criteria were met.

All samples were initially analyzed within the required holding time of 14 days from the date of sampling for preserved water samples. No action taken.

**II. Initial and Continuing Calibration:** Acceptable/With the following exceptions:

Relative response factors (RRF) and percent relative standard deviations (%RSD) in initial calibrations were technically acceptable and calculated correctly. Continuing calibrations were performed at the proper frequency, and all RRF were technically acceptable. All associated sample detects were qualified "J", all non-detects were qualified "UJ".

**III. Blank Analyses:** Acceptable/With the following exceptions:

Method blank analysis indicated several analytes were present in the method blanks associated with the samples. Analytes detected in the samples were qualified "B", blank contamination, according to the 5x/10x rule, as detailed below:

Sample ID #	Compound	Qualifier
BCMW9GW4	methylene chloride	B
	toluene	B
	ethylbenzene	B
	benzene	B
	o-xylene	B
BCMW14GW4	methylene chloride	B
	benzene	B
	toluene	B
	ethylbenzene	B
	o-xylene	B
	1,3-dichlorobenzene	B

Sample ID #	Compound	Qualifier
	1,4-dichlorobenzene	B
	1,2-dichlorobenzene	B
BC2MW1GW4	methylene chloride	B
	benzene	B
	o-xylene	B
	1,4-dichlorobenzene	B
	1,2-dichlorobenzene	B
BCMw5GW4	methylene chloride	B
	ethylbenzene	B
	benzene	B
	toluene	B
	o-xylene	B
BCMw6GW4	methylene chloride	B
	toluene	B
BC3MW2GW4	methylene chloride	B
	toluene	B
BCTB5	methylene chloride	B
	toluene	B
	o-xylene	B
	1,2-dichlorobenzene	B
BCTB6	methylene chloride	B
BCER3	methylene chloride	B
	benzene	B
	ethylbenzene	B
	m-xylene	B
	1,3-dichlorobenzene	B
	1,4-dichlorobenzene	B
	1,2-dichlorobenzene	B
BCMw15GW4	methylene chloride	B
BCMw8GW4	methylene chloride	B
	ethylbenzene	B
	o-xylene	B
	p-xylene	B
	1,3-dichlorobenzene	B
	1,2-dichlorobenzene	B
	1,4-dichlorobenzene	B
BCMw7GW4	methylene chloride	B



Sample ID #	Compound	Qualifier
	toluene	B
BCER4	methylene chloride	B
	benzene	B
	toluene	B
	ethylbenzene	B
	styrene	B
	1,3-dichlorobenzene	B
	1,2-dichlorobenzene	B
	1,4-dichlorobenzene	B
BCFB2	1,4-dichlorobenzene	B
	methylene chloride	B

**IV. Surrogate Recovery:** Acceptable/All criteria were met.

All surrogate spiking analytes recoveries were within control limits. No qualifiers were required.

**V. Matrix Spike/Matrix Spike Duplicate:** Acceptable/All criteria were met.

All Matrix Spike/Matrix Spike Duplicate results were acceptable. Two analytes, dibromochloromethane and bromoform, were outside control limits for %RPD. No qualifiers were added to the data based on MS/MSD results alone.

**VI. System Performance:** Acceptable.

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control, and stable during the course of these analyses.

**DATA VALIDATION REPORT**  
**VOLATILE ORGANIC COMPOUND ANALYSES**  
**EPA SW-846 8010/8020**  
**CASE#: 29839 SDG#: 00036**  
**Battle Creek, Michigan**

**Samples:**

B1MW1GW5D	BC1MW1GW5	BC1MW3GW5	BC2MW1GW5
BCFB01	BCFB02	BCM4GW5	BCM16GW5
BCTB01	BCTB02		

**I. Sample Holding Times:** Acceptable/All criteria were met.

All samples were initially analyzed within the required holding time of 14 days for preserved water samples. Confirmation analyses took place within required holding times. No qualifiers were added to the data.

**II. Initial and Continuing Calibration:** Acceptable/With the following exceptions:

Relative response factors (RRF) and percent relative standard deviations (%RSD) in initial calibrations were technically acceptable and calculated correctly. Continuing calibrations were performed at the proper frequency, and all RRF were technically acceptable. Several compounds exceeded criteria for %difference, associated detects for those analytes were qualified "J", non-detects were qualified "UJ".

**III. Blank Analyses:** Acceptable/With the following exceptions:

Method blank analysis indicated several analytes were present in method blanks associated with the samples. Analytes detected in the samples were qualified "B", blank contamination, according to the 5x/10x rule, as detailed below:

Sample ID #	Compound	Qualifier
B1MW1GW5D	methylene chloride	B
	chloroform	B
	1,1,1-trichloroethane	B
	1,1,2,2-TCA	B
	1,2,3-trichloropropane	B
	bromobenzene	B
BC1MW1GW5	methylene chloride	B
	1,1,1-trichloroethane	B
	carbon tetrachloride	B
	trichloroethene	B
	1,1,2,2-tetrachloroethane	B
	bromobenzene	B

Sample ID #	Compound	Qualifier
BC1MW3GW5	methylene chloride	B
	chloroform	B
	1,1,1-trichloroethane	B
	carbon tetrachloride	B
	1,1,2,2-TCA	B
BC2MW1GW5	benzene	B
	toluene	B
	ethylbenzene	B
	p-xylene	B
	m-xylene	B
	o-xylene	B
	1,3-dichlorobenzene	B
BCFB01	methylene chloride	B
	1,1,1-trichloroethane	B
	trichloroethene	B
	tetrachloroethene	B
	1,1,2,2-TCA	B
	1,3-dichlorobenzene	B
	1,4-dichlorobenzene	B
BCFB02	1,2-dichlorobenzene	B
	methylene chloride	B
	1,1,1-trichloroethane	B
	2-CEVE	B
	tetrachloroethene	B
BCM4GW5	1,1,2,2-TCA	B
	methylene chloride	B
	chloroform	B
	1,1,2,2-TCA	B
	bromobenzene	B
	4-chlorotoluene	B
BCM16GW5	1,2-dichlorobenzene	B
	methylene chloride	B
	carbon tetrachloride	B
	chlorobenzene	B
	1,1,2,2-TCA	B
	bromobenzene	B
	4-chlorotoluene	B
	1,4-dichlorobenzene	B

**IV. Surrogate Recovery:** Acceptable/With the following exceptions:

All surrogate spiking analytes recoveries were within control limits, with two exceptions: samples TB02 and B1MW1GW5D indicated low recoveries for surrogate spiking analytes. "J", detected, estimated, and "UJ", not detected, estimated qualifiers were added to the data for these samples.

**V. Matrix Spike/Matrix Spike Duplicate:** Acceptable/All criteria were met.

All Matrix Spike/Matrix Spike Duplicate results were within control limits. No qualifiers were added to the data.

**VI. System Performance:** Acceptable.

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control, and stable during the course of these analyses.

**APPENDIX G: CHAIN OF CUSTODY FORMS**



Analytical Laboratories  
5702 Bolsa Ave.  
Huntington Beach, Ca. 92649  
(714) 892-2565 FAX (714) 890-4032

Client Earth Technology

Address 683 Emory Valley Rd.

Project Name / Number 948901-08

Contract / Purchase Order / Quote \_\_\_\_\_

614701 614723 614727  
705 729 728  
710 725 728  
714 Project Manager J. Bragg

Telephone No. 616-483-9404

Fax No. 616-481-3834

Samplers: (Signature) guy

# Chain of Custody Record

Lab job no.:

Date 05-18-94

Page 1 of 2

Analysis Required		No. of Containers	Remarks
Metals	Organics		
✓	✓	✓	Dropped and corrected sample #s
✓	✓	✓	
✓	✓	✓	BC-MW2-GW4
✓	✓	✓	BC-MW2-GW4
✓	✓	✓	BC-MW2-GW4
✓	✓	✓	BC-MW2-GW4
✓	✓	✓	BC-MW1-GW4
✓	✓	✓	BC-MW1-GW4

Laboratory Sample Number	Field Sample Number	Location	Date	Time	Sample Type	Type/Size of Container	Preservation Chemical	
							Temp.	Chemical
BC-FB1	BC	5-18	1630		water	40ml vial		HCl
BC-FB1	BC	5-18	1630		"	Plastic 1tr		HNO3
BC-FB1	BC	5-18	1630		"	Plastic 1tr		
BC-FB1	BC	"	"	"	"	Amber 1tr		
BC-TB1	"	"	"	"	"	40ml vial		HCl
BC-TB1	BC	5-19			"	40ml vial		HCl
BC-TB1	"	"	"	"	"	Plastic 1tr		HNO3
BC-TB1	"	"	"	"	"	Plastic 1tr		
BC-TB1	"	"	"	"	"	Amber 1tr		
BC-TB1	"	"	1445		"	40ml vial		HCl
BC-TB1	"	"	1445		"	Plastic 1tr		HNO3
BC-TB1	"	"	1445		"	Plastic 1tr		

Relinquished by: Signature <u>J. Bragg</u> Printed <u>J. Bragg</u> Company <u>Earth Technology</u> Reason _____	Received by: Signature <u>J. Bragg</u> Printed <u>J. Bragg</u> Company <u>Earth Technology</u> Reason _____	Date <u>5/19/94</u> Time <u>94</u>	Date _____ Time _____
Comments: _____		After analysis, samples are to be: <input type="checkbox"/> Disposed of (additional fee) <input type="checkbox"/> Stored (90 days max) <input type="checkbox"/> Stored over 90 days (additional fee) <input type="checkbox"/> Returned to customer	
Method of Shipment: <u>Fedex</u>		RECEIVED IN <u>948901</u>	
Shipment Number: <u>47166540493</u>		GOOD CONDITION	
Special Instructions: _____		F1000	

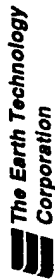
# Chain of Custody Record

**The Earth Technology Corporation**  
Analytical Laboratories  
5702 Boles Ave.  
Huntington Beach, Ca. 92649  
(714) 892-2565 FAX (714) 890-4032

Client Earth Technology  
Address 683 Cherry Valley Rd  
Oak Ridge, TN  
Project Name / Number 948901-08  
Contract / Purchase Order / Quote \_\_\_\_\_  
Project Manager J. Dingler  
Telephone No. 616-488-9404  
Fax No. 616-481-3834  
Samplers: (Signature) \_\_\_\_\_

[illegible]

Relinquished by: Signature <u>Samuel</u> Printed <u>Jack Bruegel</u> Company <u>Earth Tech</u> Reason _____	Date <u>5/17/94</u> Time <u>1600</u>	Received by: Signature <u>[Signature]</u> Printed <u>V. BATTEN</u> Company <u>Cognac</u> Reason <u>5/26/94 9985</u>	Relinquished by: Signature _____ Printed _____ Company _____ Reason _____	After analysis, samples are to be: <input type="checkbox"/> Disposed of (additional fee) <input type="checkbox"/> Stored (90 days max) <input type="checkbox"/> Stored over 90 days (additional fee) <input type="checkbox"/> Returned to customer
Method of Shipment: <u>Fedex</u> Shipment No. <u># 7766540493</u> Special Instructions: _____		Comments: _____ _____ _____ _____		



Analytical Laboratories

5702 Bolsa Ave.

Huntington Beach, Ca. 92649

(714) 892-2565 FAX (714) 890-4032

Client Earth Technology

Address 683 Cherry Valley Rd.

Oak Ridge, TN

Project Name / Number 948901-08

Project Manager J. Briegel

Telephone No. 616-483-9404

Fax No. 616-481-3834

Samplers: (Signature) \_\_\_\_\_

Contract / Purchase Order / Quote \_\_\_\_\_

# Chain of Custody Record

Lab job no.:

Date 5-20-94

Page 1 of 2

Analysis Required		No. of Containers	Remarks
Analysis	Required		
VOCs	8/20/90	1	
Metals	8/20/90	1	
CI	8/20/90	1	
SO <sub>4</sub>	8/20/90	1	
TOC	8/20/90	1	

Laboratory Sample Number	Field Sample Number	Location	Date	Time	Sample Type	Type/Size of Container	Preservation	
							Temp.	Chemical
BC-MW13-6W4		QC	5/20/94	08:00	40 ml vial		4°	HCl
BC-MW13-6W4		"	"	"	"	Amber ltr	"	"
BC-MW13-6W4		"	"	"	"	Plastic ltr	"	H <sub>2</sub> O <sub>2</sub>
BC-MW13-6W4		"	"	"	"	Plastic ltr	"	"
BC-MW13-6W4		"	"	10:50	"	40 ml vial	"	HCl
BC-MW13-6W4		"	"	"	"	Amber ltr	"	"
BC-MW13-6W4		"	"	"	"	Plastic ltr	"	H <sub>2</sub> O <sub>2</sub>
BC-MW13-6W4		"	"	"	"	Plastic ltr	"	"
BC-MW16-6W4		"	"	08:45	"	40 ml vial	"	HCl
BC-MW16-6W4		"	"	"	"	Amber ltr	"	"
BC-MW16-6W4		"	"	"	"	Plastic ltr	"	H <sub>2</sub> O <sub>2</sub>

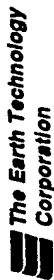
Relinquished by:	Received by:
Signature <u>J. Briegel</u>	Signature <u>Melissa Stevens</u>
Printed <u>Jack Briegel</u>	Printed <u>Melissa Stevens</u>
Company <u>Earth Tech</u>	Company <u>Campanella Env.</u>
Reason _____	Reason _____
Date <u>5/20/94</u>	Date _____
Time <u>15:00</u>	Time _____

Comments:	After analysis, samples are to be:
_____	<input type="checkbox"/> Disposed of (additional fee)
_____	<input type="checkbox"/> Stored (90 days max)
_____	<input type="checkbox"/> Stored over 90 days (additional fee)
_____	<input type="checkbox"/> Returned to customer



COC # BC 82094-07 2082

## Chain of Custody Record



Analytical Laboratories

5702 Bolsa Ave.

Huntington Beach, Ca. 92649

(714) 892-2565 FAX (714) 890-4032

Client Earth TechnologyProject Manager J. BiegelAddress 683 Cherry Valley RdOak Ridge, TNProject Name / Number 948901-08Telephone No. 616-483-9404Fax No. 616-481-3834

Samplers: (Signature) \_\_\_\_\_

Contract / Purchase Order / Quote \_\_\_\_\_

⑧

No. of Containers	Analysis Required	Remarks
82094-07	CL SOL TSS	u 15113182
82094-07	CL SOL TSS	106 05112
82094-07	CL SOL TSS	111 05112
82094-07	CL SOL TSS	116 1117
82094-07	CL SOL TSS	102
82094-07	CL SOL TSS	107

Laboratory Sample Number	Field Sample Number	Location	Date	Time	Sample Type	Type/Size of Container	Temp.	Preservation Chemical
BC-44116-GW4		BC	5-20-08	1540	Water	Plastic 1tr	40	
BC-FB								
BC-ER1		"	5-19-08	1540	"	Plastic 1tr	"	
BC-ER1		"	"	"	"	Plastic 1tr	"	H2O2
BC-ER1		"	"	"	"	Amber 1tr	"	
BC-FB2		"	"	1510	"	Plastic 1tr	"	
BC-FB2		"	"	"	"	Plastic 1tr	"	H2O2
BC-FB2		"	"	"	"	Amber 1tr	"	
BC-ER1		"	"	1540	"	40 ml vial	"	HCl
BC-FB2		"	"	1510	"	"	"	"
BC-TB2		"	"	0800	"	"	"	"
BC-FB2		"	5-20-08	1540	"	"	"	HCl

Relinquished by:	Received by:
Signature <u>J. Biegel</u>	Signature <u>Melissa Stevens</u>
Printed <u>Jack Biegel</u>	Printed <u>Melissa Stevens</u>
Company <u>Earth Tech</u>	Company <u>Campanella Env.</u>
Reason _____	Reason _____

Relinquished by:	Received by:
Signature _____	Signature _____
Printed _____	Printed _____
Company _____	Company _____
Reason _____	Reason _____

Method of Shipment: <u>FedEx</u>	Comments: _____
Shipment No. _____	_____
Special Instructions: _____	_____

After analysis, samples are to be:	
<input type="checkbox"/> Disposed of (additional fee)	_____
<input type="checkbox"/> Stored (90 days max)	_____
<input type="checkbox"/> Stored over 90 days (additional fee)	_____
<input type="checkbox"/> Returned to customer	_____

Received by:	Signature <u>Melissa Stevens</u>
Printed <u>Melissa Stevens</u>	Company <u>Campanella Env.</u>
Reason _____	_____

Date _____	Time _____
------------	------------

SAMPLES RECEIVED IN GOOD CONDITION

5/21/04



Analytical Laboratories

5702 Bolsa Ave.

Huntington Beach, Ca. 92649

(714) 892-2565

FAX (714) 890-4032

Client Earth Technology

Address 683 Elroy Valley Rd.

Oak Ridge TN 37716

Project Name / Number 948901-08

Project Manager J. Briegel

Telephone No. 615-483-9404

Fax No. 615-481-3834

Samplers: (Signature) [Signature]

Contract / Purchase Order / Quote \_\_\_\_\_

# Chain of Custody Record

(13)

Lab job no.:

Date 5-23-94

Page 1 of 3

Deleted all  
dash front IDs.  
IDs used  
BCMW17G W4  
BCMW17G W4  
BCMW17G W4  
BCMW17G W4  
All metals  
Returned

Laboratory Sample Number	Field Sample Number	Location	Date	Time	Sample Type	Type/Size of Container	Temp.	Preservation Chemical
BC-MW11-GW4	BC-MW11-GW4	BC	5-23	1040	Water	40 ml vial	4°	HCl
BC-MW11-GW4	BC-MW11-GW4		"	"	"	Plastic 1tr		H2O2
BC-MW11-GW4	BC-MW11-GW4		"	"	"	Plastic 1tr		
BC-MW11-GW4	BC-MW11-GW4		"	"	"	Amber 1tr		
BC-MW12-GW4	BC-MW12-GW4		"	1130	"	40 ml vial		HCl
BC-MW12-GW4	BC-MW12-GW4		"	"	"	Plastic 1tr		H2O2
BC-MW12-GW4	BC-MW12-GW4		"	"	"	Amber 1tr		
BC-MW11-GW4	BC-MW11-GW4		"	0740	"	40 ml vial		HCl
BC-MW11-GW4	BC-MW11-GW4		"	"	"	Amber 1tr		
BC-MW11-GW4	BC-MW11-GW4		"	"	"	Plastic 1tr		H2O2
BC-MW17-GW4	BC-MW17-GW4		"	0830	"	40 ml vial		HCl
BC-MW17-GW4	BC-MW17-GW4		"	"	"	Amber 1tr		

RECEIVED IN  
GOOD CONDITION  
MIS 5/24/94  
Metals only - H2O2

Extra volumes  
For H2/H2O  
Metals only

Relinquished by: Signature <u>[Signature]</u> Printed <u>J. Briegel</u> Company <u>J. Briegel</u> Reason <u>Redup</u>	Received by: Signature <u>[Signature]</u> Printed <u>262</u> Company <u>271</u> Reason <u>272</u>	Relinquished by: Signature <u>[Signature]</u> Printed <u>262</u> Company <u>271</u> Reason <u>272</u>	Received by: Signature <u>[Signature]</u> Printed <u>262</u> Company <u>271</u> Reason <u>272</u>
---	---	---	---

Method of Shipment: <u>Redup</u>	Comments: <u>251</u>	After analysis, samples are to be: <input type="checkbox"/> Disposed of (additional fee) <input type="checkbox"/> Stored (90 days max) <input type="checkbox"/> Stored over 90 days (additional fee) <input type="checkbox"/> Returned to customer
Shipment No. <u>15767893342</u>	<u>260</u>	
Special Instructions:	<u>258</u>	
	<u>267</u>	
	<u>277</u>	
	<u>278</u>	

# Chain of Custody Record

Lab job no.: \_\_\_\_\_  
Date 5-23-94  
Page 2 of 3

12

**Analytical Laboratories**  
5702 Bolsa Ave.  
Huntington Beach, Ca. 92649  
(714) 892-2565      FAX (714) 890-4032

Client Earth Technology  
Address 6883 Emory Valley Rd.  
Oak Ridge, TN 37716  
Project Name / Number 948901-08  
Contract / Purchase Order / Quote \_\_\_\_\_

Project Manager J. Oriege  
Telephone No. 615-483-9404  
Fax No. 615-481-3834  
Samplers: (Signature) Chris Hagan

[illegible]



COC BCS/24/94 - 02 NO 2414 pgs 1 of 4



3306 Chapel Hill/Nelson Highway  
Research Triangle Park, NC 27709

1-800-833-5097

# CHAIN-OF-CUSTODY RECORD

Ship to: <b>Compuchem</b>	Project Name: <b>948901-08</b>	Field Point-of-Contact: <b>J. Biegel</b>
Carrier: <b>Fedex</b>	Sample Name: <b>Carol Frye</b>	Telephone No: <b>615-483-9404</b>
Airbill No.: <b>1567893176</b>	Sampler Signature: <b>Carol Frye</b>	Sampling for project complete? Y or N (See Note 1)
Box #1: 1. Surface Water 2. Ground Water 3. Leachate 4. Rinseate 5. Soil/Sediment/Sediment	Box #2: A. HCl B. HNO <sub>3</sub> C. NaHSO <sub>4</sub> D. Na <sub>2</sub> S <sub>2</sub> O <sub>8</sub>	Box #3: F. Filtered U. Unfiltered
Box #4: C. CLP 300 S. SW-846 W. CWA 600-series L. Low Conc. CLP	Box #5: R. Radiological T. TCLP O. Other	Box #6: H - High M - Medium L - Low

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; see Note 2)	Date: Year: 1994	Time	Matrix	Preservative	Box #1	Box #2	Box #3 Filtered/Unfiltered	Box #4 Method	Box #5 Expect. Conc.	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis							Inorganics				Other					Remarks/Comments						
												VOA-GCMS	SV-GCMS	Pest/PCB-GC	Herb-GC	VOA-GC	Metals	Mercury	Cyanides	Radiologicals	TOC/TOX	O&G/TPH	Phenols	Other										
BCMW5GWW4	5/23	10:25	2	F			F			1																							565	<del>565</del>
BCMW5GWW4	5/23	12:25	"	E			U			1																							567	CI 804 TDS
BCMW14GWW4	5/22	16:10	"	E			U			1																							570	CI 804 TDS
BCMW14GWW4	5/22	16:10	"	B			F			1																							571	
BC2MW1GWW4	5/23	11:30	"	B			F			1																							577	
BC2MW1GWW4	5/23	11:30	"	E			U			1																							579	CI 804 TDS
BCMW6GWW4	5/22	14:47	"	E			U			1																							500	CI 804 TDS
BCMW6GWW4	5/22	14:47	"	B			F			1																							501	
BCMW4GWW4	5/23	08:10	"	B			F			1																								CI 804 TDS
BCMW4GWW4	5/23	08:10	"	E			U			1																								

Client's Special Instructions:		Describe Problems, If Any:	
Lab: Received in Good Condition: Y or N	Date: 5/24/94	Date: 5/24/94	Date: 5/24/94
#1 Relinquished By: (Sig.)	Time: 16:30	Time: 16:30	Time: 16:30
Company Name: Compuchem	Company Name: Compuchem	Company Name: Compuchem	Company Name: Compuchem
#1 Received By: (Sig.)	Date: 5/24/94	Date: 5/24/94	Date: 5/24/94
Company Name: Compuchem	Time: 08:10	Time: 08:10	Time: 08:10
Sample storage time requested? (in days, see Note 3)		Sample storage time requested? (in days, see Note 3)	
DESTROY or RETURN data after five years of archival? (Circle choice, see Note 4)		DESTROY or RETURN data after five years of archival? (Circle choice, see Note 4)	

Note [1]: If "Y" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio. If "N" lab will begin processing batches now. Note [2]: If CLP Inorganics data is required, ID limited to maximum of six characters.  
Note [3]: Samples stored 90 days after data report mailed at no extra charge. Note [4]: All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.

# COMPUCHEM ENVIRONMENTAL CORPORATION

3306 Chapel Hill/Nelson Highway  
Research Triangle Park, NC 27709

1-800-833-5097

## CHAIN-OF-CUSTODY RECORD

Ship to: **Project Name:** 948961-08  
**Sampler Name:** C. Faye  
**Carrier:** FedEx  
**Airbill No.:** 1567893176

**Field Point-of-Contact:** Jack Biegel  
**Telephone No:** 615-483-9404  
**Sampling for project complete?** Y or N (See Note 1.)  
**Project-specific (PS) or Batch (B) QC:** \_\_\_\_\_

**Box #1:** 1. Surface Water  
2. Ground Water  
3. Leachate  
4. Rinse  
5. Soil/Sediment/Sludge

**Box #2:** A. HCl  
B. HNO<sub>3</sub>  
C. NaHSO<sub>4</sub>  
D. Na<sub>2</sub>SO<sub>4</sub>

**Box #3:** E. Ice Only  
F. Flamed  
G. Unflamed

**Box #4:** C. CLP 300  
S. SW-946  
W. CWA 900-series  
L. Low Conc. CLP

**Box #5:** H. High  
M. Medium  
L. Low

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; see Note 2)	Date: Year: 19	Time	Matrix	Preservative	Box #2	Box #3	Box #4	Box #5	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis	Inorganics	Other	Remarks/Comments
BCMW18GW45	6/23	16:15	2	B	F				1		VOA-GC/MS SV-GC/MS Pest/PCB-GC Herb-GC VOA-GC	Metals Mercury Cyanides Radiologicals TOC/TOX O&G/PH Phenols Other		6/15/502
BCMW18GW45	6/23	16:15	"	E	U				1					503
BCMW18GW45	6/23	16:00	"	E	U				2					547
BCMW18GW45	6/23	16:00	"	B	F				2					551
BCMW18GW45	6/23	17:55	"	B	F				1					581
BCMW18GW45	6/23	16:00	"	E	U				4					536
BCMW18GW45	6/23	16:15	"	E	U				2					541
BCMW18GW45	6/23	16:15	"	E	U				2					544
BCMW18GW45	6/23	14:47	"	E	U				2					Extra volume for MS/MSDS
BCMW18GW45	6/23	16:10	"	E	U				2					Extra volume for MS/MSDS

**Client's Special Instructions:**

**Lab: Received In Good Condition:** (Sig) \_\_\_\_\_ Date: 6/24/94  
**#1 Relinquished By:** (Sig) \_\_\_\_\_ Date: 6/24/94  
**Company Name:** Compuchem  
**#1 Received By:** (Sig) \_\_\_\_\_ Date: 6/24/94  
**Company Name:** Compuchem

**Describe Problems, if Any:**

**#2 Relinquished By:** (Sig) \_\_\_\_\_ Date: 6/24/94  
**Company Name:** \_\_\_\_\_  
**#2 Received By:** (Sig) \_\_\_\_\_ Date: 6/24/94  
**Company Name:** \_\_\_\_\_

**Sample storage time requested?** (in days, see Note 3)  
**DESTROY or RETURN** data after five years of archival? (Circle choice, see Note 4)

Notes (1): If "Y" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "N" lab will begin processing batches now. Note (2): If CLP Inorganics data is required, 10 limited to maximum of six characters. Note (3): Samples stored 60 days after date report mailed at no extra charge. Note (4): All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.





3306 Chapel Hill/Nelson Highway  
Research Triangle Park, NC 27709

1-800-833-5097

- Box #1
- 1. Surface Water
  - 2. Ground Water
  - 3. Leachate
  - 4. Rinseate
  - 5. Soil/Sediment/Sludge
  - 6. Trip Blank
  - 7. Oil
  - 8. Waste
  - 9. Other

Ship to: **Compuchem**

Project Name: **948901-08**

Field Point-of-Contact: **J. Biegel**

Telephone No: **615-483-9404**

Sampling for project complete? Y or N (See Note 1.)

Project-specific (PS) or Batch (B) QC: \_\_\_\_\_

Carrier: **Fedex**

Altitude No: **1567893126**

Box #2: A. HCl B. HNO<sub>3</sub> C. NaHSO<sub>3</sub> D. Na<sub>2</sub>S<sub>2</sub>O<sub>8</sub>

Box #3: F. Flaming U. Unfiltered

Box #4: C. CLP 900 S. SW 940 W. CWA 600-series L. Low Conc. CLP

Box #6: H. High M. Medium L. Low

Sample ID (Organics: 9 characters max; inorganics: 6 characters; see Note 2)	Date: Year, 19	Matrix	Preservative	Box #1	Box #2	Box #3	Box #4	Box #5	Expect. Conc.	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis	Inorganics	Other	Remarks/Comments
BC3M02S04	5/23/17	2	E	U	S	M	2								615546
BC2M01G04	5/23/17	1	E	U	S	1									543
BC4M04G04	5/23/17	2	E	U	S	2									540
BC2M01G04	5/23/17	2	E	U	S	2									one bottle was broken
BC2M01G04	5/23/17	2	E	U	S	2									Client note.
BC2M01G04	5/23/17	2	E	U	S	2									VIA analysis 615512
BC2M01G04	5/23/17	2	E	U	S	2									615521 518
BC2M01G04	5/23/17	2	E	U	S	2									531 519
BC2M01G04	5/23/17	2	E	U	S	2									534 520
BC2M01G04	5/23/17	2	E	U	S	2									Extra volume for MS/MS
BC2M01G04	5/23/17	2	E	U	S	2									VIA bottles labelled → BC3M01G04
BC2M01G04	5/23/17	2	E	U	S	2									615544

Client's Special Instructions:

Lab: Received in Good Condition (G) or N

#1 Relinquished By: (Sig) **Earl Tech** Date: **5/24/17** Relinquished By: (Sig)

Company Name: **Earl Tech** Company Name:

#1 Received By: (Sig) **Compuchem** Date: **5/25/17** #2 Received By: (Sig)

Company Name: **Compuchem** Company Name:

Describe Problems, if Any:

Sample storage time requested? (in days, see Note 3)

DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)

Notes (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. Note (2): If CLP inorganics data is required, ID limited to maximum of six characters. Note (3): Samples stored 90 days after date report mailed at no extra charge. Note (4): All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.





3306 Chapel Hill/Nelson Highway  
Research Triangle Park, NC 27709

1-800-833-5097

615944 615945 615946 615986 615996 615962 615896 615930 615932  
| 950 | 952 | 956 | 947 | 943 | 944 | 900 | 927  
| 972 | 978 | 983 | 958 | 949 | 904 | 919 | 929 NO 2483  
| 976 | 979 | 979 | 979 | 979 | 979 | 917 | 935 | 931

# CHAIN-OF-CUSTODY RECORD

Ship to:	Project Name: <b>948901-08</b>	Field Point-of-Contact: <b>Jack Briedel</b>
Carrier: <b>KDEX</b>	Sampler Name: <b>Carol Edge</b>	Telephone No: <b>615-883-9404</b>
Airbill No.: <b>1561893314</b>	Sampler Signature: <i>Carol Edge</i>	Sampling for project complete? Y or N (See Note 1.)
Box #2: A. HCl B. HNO <sub>3</sub> C. NaHSO <sub>4</sub> D. Na <sub>2</sub> S <sub>2</sub> O <sub>8</sub>	Box #3: F. Filtered U. Unfiltered	Project-specific (PS) or Batch (B) QC: _____

Box #1: 1. Surface Water 2. Ground Water 3. Leachate 4. Effluents 5. Solid/Sediment/Sudge	Box #2: 6. Trip Blank 7. Oil 8. Waste 9. Other: _____	Box #4: C. CLP 300 S. SW-846 W. CWA 600-series L. Low Conc. CLP	Box #5: H - High M - Medium L - Low
---	--	--	---

Sample ID (Organics: 9 characters max; Inorganics: 6 characters; see Note 2)	Date: Year: 19 <u>94</u>	Time	Matrix	Preservative	Box #1	Box #2	Box #3	Box #4	Box #5	No. of Bottles	Use for Lab QC (MS or DUP)	VOA-GC/MS (MS or DUP)	SV-GC/MS	Herb-GC	PCB/PCB-GC	VOA-GC	Metals	Mercury	Cyanides	Radiochemicals	TOC/TOX	Phenols	Other	Remarks/Comments
BCMW156W	4/5/94	10:40	2	A,B						8	X	X	X				X							CL 804 TDS
BCMW86W	4/5/94	11:30	2	AB						8	X	X	X				X							CL 804 TDS used BC MW 86W
BCMW76W	4/5/94	10:50	2	AB						8	X	X	X				X							CL 804 TDS used BC MW 76W
BCER4	4/5/94	15:40	4	AB						7	X	X	X				X							metals - priority pollutant list
BCER3	5/12/94	13:50	4	AB						8	X	X	X				X							CL 804 TDS used BC ER3
BC567000	5/12/94	13:45	5							1	X	X	X				X							soils metals - priority pollutant list
BC569020	5/12/94	15:10	5							1	X	X	X				X							" " " "
BC561000	5/12/94	14:05	5							1	X	X	X				X							" " " "
BC568000	5/12/94	14:20	5							1	X	X	X				X							" " " "
BC567020	5/12/94	13:58	5							1	X	X	X				X							" " " "

Client's Special Instructions:				Describe Problems, if Any:			
Lab: Received in Good Condition	By: N	Date: <u>4/5/94</u>	Time: <u>10:40</u>	#1 Relinquished By: (Sig.)	Date: <u>4/5/94</u>	#2 Relinquished By: (Sig.)	Date: <u>4/5/94</u>
Company Name: <u>Each Tech</u>		Time: <u>11:30</u>		Company Name:		Company Name:	
#1 Received By: (Sig.) <u>Carol Edge</u>		Date: <u>5/26/94</u>	Time: <u>0830</u>	#2 Received By: (Sig.)		#3 Received By: (Sig.)	
Company Name:				Company Name:		Company Name:	

Notes (1): If "Y" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "N" lab will begin processing batches now. Note (2): If CLP Inorganics data is required, ID limited to maximum of six characters.  
Note (3): Samples stored 60 days after data report mailed at no extra charge. Note (4): All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.



**COMPUCHEM**  
ENVIRONMENTAL  
CORPORATION

3306 Chapel Hill/Nelson Highway  
Research Triangle Park, NC 27709

1-800-833-5097

- Box #1: 1. Surface Water  
2. Ground Water  
3. Leachate  
4. Effluent  
5. Soil/Sediment/Sludge  
6. Trip Blank  
7. Oil  
8. Waste  
9. Other: \_\_\_\_\_

- Box #2: A. HCl  
B. HNO<sub>3</sub>  
C. NaHSO<sub>4</sub>  
D. Na<sub>2</sub>SO<sub>4</sub>  
E. Ice Only  
F. Other: \_\_\_\_\_  
N. Not Preserved

Carrier: **Box 15C 1813316**

Ship to: 942  
938  
936  
937

Project Name:

948901-08

Sampler Name:

Carol Faye  
Dated: 5/26/94

Field Point-of-Contact:

Jack Briege

Telephone No: 615-483-9404

Sampling for project complete? Y or N (See Note 1.)

Project-specific (PS) or Batch (B) QC: \_\_\_\_\_

Box #5: H - High  
M - Medium  
L - Low

Box #4: C CLP 200  
S SW-200  
W CWA 600-series  
L Low Conc CLP  
R Radiological  
T TCLP  
O Other

Sample ID (Organics: 9 characters max; Inorganics: 6 characters; see Note 2)	Date: Year: 19	Time	Matrix	Box #1	Preservative	Box #2	Box #3	Box #4	Box #5	Expect. Conc.	No. of Bottles	Organics Analysis										Inorganics					Other	Remarks/Comments	
												Use for Lab QC (MS or DUP)	VOA-GC/MS	Pest/PCB-GC	Herb-GC	VOA-GC	Metals	Mercury	Cyanides	Radiologicals	TOC/TOX	O&G/TPH	Phenols	Other					
BC5B602035	5/24	13:30	5								1	X																	soils metals priority pull
BC5B600015	5/24	13:15	5								1	X																	"
BC5B900015	5/24	14:55	5								1	X																	"
BC5B802035	5/24	14:40	5								1	X																	"
BCFB2	5/24	13:15	4		A						4	X																	resample
BCTB6	5/24	14:00	6		A						2	X																	

Client's Special Instructions:

Lab: Received in Good Condition? Y or N

#1 Relinquished By: (Sig.) Jack Briege

Company Name: Earth Tech

#1 Received By: (Sig.) J. Rudie

Company Name: Compuchem

Describe Problems, if Any:

Date: 5/26/94

Time: 1400

Company Name:

#2 Received By: (Sig.)

Company Name:

Sample storage time requested? (in days, see Note 3)

Date:

Time:

Company Name:

#3 Received By: (Sig.)

Company Name:

Notes (1): If "Y" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "N" lab will begin processing batches now. Note (2): If CLP inorganics duplicate required, ID limited to maximum of six characters.

Note (3): Samples stored 90 days after date report mailed at no extra charge. Note (4): All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.

Doc # BC 5/19/99 02

# Chain of Custody Record



**The Earth Technology  
Corporation**

Analytical Laboratories

**5702 Bolsa Ave.**

**Huntington Beach, Ca. 92649**

**714) 892-2565**  
**FAX (714) 890-4032**

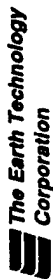
**Project Manager** J. Siegel

Telephone No. ~~645~~ 483-9404

Fax. No. 6015-481-3834

**Samplers: (Signature)** \_\_\_\_\_

**Contract / Purchase Order / Quote**[illegible]



Analytical Laboratories

5702 Bolsa Ave.

Huntington Beach, Ca. 92649

(714) 892-2565

FAX (714) 890-4032

Client Earth Technology

Address 683 Energy Valley Rd.

Oak Ridge, TN 37816

Project Name / Number 948701-08

Contract / Purchase Order / Quote \_\_\_\_\_

Project Manager J. Briegel

Telephone No. 615-483-9404

Fax No. 615-481-3834

Samplers: (Signature) [Signature]

# Chain of Custody Record

Lab job no.: \_\_\_\_\_

Date 5-30-94

Page 1 of 1

Laboratory Sample Number	Field Sample Number	Location	Date	Time	Sample Type	Type/Size of Container	Temp.	Preservation Chemical	No. of Containers	Analysis Required	Remarks
BC-FB3		BC	0530	1340	Under	Plastic			1		
BC-Hu16-GW4		"	"	0845	"	"			1		
BC-Hu13-GW4		"	"	0845	"	"			1		
BC-Hu13-GW4		"	"	1050	"	"			1		
BC-Hu17-GW4		"	"	1105	"	"			1		
BC-Hu18-GW4		"	"	1115	"	"			1		
BC-Hu15-GW4		"	"	1100	"	"			1		
BC-ER1		"	"	1540	"	"			1		
BC-FB2		"	"	1570	"	"			1		

Relinquished by:	Received by:	Retinquired by:
Signature <u>[Signature]</u>	Signature <u>Walt Balasa</u>	Signature _____
Printed <u>Bob Fife</u>	Printed <u>WALT BALASA</u>	Printed _____
Company <u>Earth Tech</u>	Company <u>FAB LABORATORIES</u>	Company _____
Reason _____	Reason _____	Reason _____

Date	Time	Signature	Printed	Company	Reason
5-30	1515				

After analysis, samples are to be:

☐ Disposed of (additional fee)

☐ Stored (90 days max)

☐ Stored over 90 days (additional fee)

☐ Returned to customer

Method of Shipment: \_\_\_\_\_

Shipment No. \_\_\_\_\_

Special Instructions: \_\_\_\_\_

Comments: \_\_\_\_\_

## Analytical Laboratories

5702 Bolsa Ave.

**Huntington Beach, Ca. 92649**

**FAX (714) 992-2565**

**FAX (714) 890-4032**

Client Franklin D. Roosevelt

1874-1875

Address Oak Ridge TN 37916

Project Name / Number 948901-08

**Contract / Purchase Order / Quote**

**Project Manager** ~~D. Sizemore~~

Telephone No. ~~605-483-9401~~

Fax. No. 615-481-3834

**Samplers: (Signature)** 

Client Earth Technology

Address 688 E. Main Valley Rd.  
Oak Ridge TN 37516

Project Name / Number 948901-08

Project Manager J. Biegel

Telephone No. 615-483-9401

Fax No. 615-481-3834

Samplers: (Signature) C. Egan

Contract / Purchase Order / Quote \_\_\_\_\_

Analysis Required

No. of Containers

Remarks

Sample Number	Field Sample Number	Location	Date	Time	Sample Type	Type/Size of Container	Temp.	Preservation Chemical
BC-1411-GW4	BC	5-20-1040				Plastic		
BC-1412-GW4	"	"	11:30		"	"		
BC-1413-GW4	"	"	1:47		"	"		
BC-1414-GW4	"	"	1:16		"	"		
BC-1415-GW4	"	5-23-1130			"	"		
BC-1416-GW4	"	"	1:02		"	"		
BC-1417-GW4	"	"	0816		"	"		

Relinquished by:

Signature C. Egan

Printed C. Egan

Company Earth Technology

Reason \_\_\_\_\_

Received by:

Signature [Signature]

Printed [Printed]

Company [Company]

Reason \_\_\_\_\_

Date 5-23-11

Time 1500

Method of Shipment: \_\_\_\_\_

Shipment No. \_\_\_\_\_

Special Instructions: \_\_\_\_\_

Comments: \_\_\_\_\_


After analysis, samples are to be:

☐ Disposed of (additional fee)

☐ Stored (90 days max)

☐ Stored over 90 days (additional fee)

☐ Returned to customer



**The Earth Technology  
Corporation**

**Analytical Laboratories**

**5702 Bolsa Ave.**

**Huntington Beach, Ca. 92649**

**(714) 892-2565**  
**FAX (714) 890-4032**

Client Carla Rodriguez

**Address** 632 E. 1st St. N. Valley Park

Project Name / Number Oak Ridge 410 37716  
0458907-03

**Contract / Purchase Order / Quote**

**Project Manager** J. Bingham

Telephone No. 615-483-9404

Fax. No. 613-481-3834

**Samplers: (Signature)** Charles S. Smith

# Chain of Custody Record

**Lab job no.:**

Date \_\_\_\_\_

Page 1 of 1[illegible]

**E1000**

# COMPUCHEM ENVIRONMENTAL CORPORATION

3306 Chapel Hill/Nelson Highway  
Research Triangle Park, NC 27709

## CHAIN-OF-CUSTODY RECORD

page 1 of 2  
# 29588

4575

Ship to: <b>EARTH TECH</b> Project Name: <b>10th Fg, MANG</b> Sampler Name: <b>Battle Creek, Mich</b>		Field Point-of-Contact: <b>615 483-9404</b> Telephone No.: <b>616 580-1224</b>	
Carrier: <b>FENEX</b> Airbill No.: <b>9569800402</b>		Sampling for project complete? <b>Y</b> or <b>(N)</b> (See Note 1) Project-specific (PS) or Batch (B) QC: <b>PS</b>	
Box #1: 1. Surface Water 2. Ground Water 3. Leachate 4. Rinse 5. Soil / Sediment / Sludge		Box #2: A. HCl B. HNO <sub>3</sub> C. NaHSO <sub>4</sub> D. Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	
Box #3: F. Filtered U. Unfiltered		Box #4: C. CLP 3/80 S. SW-846 W. CWA 600-series L. Low Conc. CLP	
Box #5: H. High M. Medium L. Low			

Sample ID (Organics: 9 characters max, Inorganics: 8 characters; See Note 2)	Date: Year: 19	Time	Matrix	Box #1	Box #2	Box #3	Box #4	Box #5	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis										Inorganics				Remarks / Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
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Client's Special Instructions:

Lab: Received in Good Condition **Y** or **N**

#1 Relinquished By: (Sig) **J. Briegel** Date: **11/17/99** Time: **17:00**

Company Name: **EARTH TECH**

#1 Received By: (Sig) **J. Briegel** Date: **11/18/99** Time: **17:00**

Company Name: **CompuChem**

#3 Relinquished By: (Sig) \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

Company Name: \_\_\_\_\_

#3 Received By: (Sig) \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

Company Name: \_\_\_\_\_

Sample storage time requested? (In days, see Note 3) \_\_\_\_\_

DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4) \_\_\_\_\_

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. Note (2): If CLP Inorganics diskette required, ID limited to maximum of six characters.

Note (3): Samples stored 60 days after date report mailed at no extra charge. Note (4): All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.



3306 Chapel Hill/Nelson Highway  
Research Triangle Park, NC 27709

# CHAIN-OF-CUSTODY RECORD

Ship to:

Project Name: Wompa Mian Field Point-of-Contact: 615-483-9404

Sampler Name: Battle Creek, N.C. Telephone No.: 616-580-1224

Carrier: Fedex Airbill No.: 9569800402

BOX #1: 1. Surface Water 2. Ground Water 3. Leachate 4. Rinseate 5. Soil / Sediment / Sludge	BOX #2: A. HCl B. HNO <sub>3</sub> C. NaHSO <sub>4</sub> D. Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	BOX #3: F. Filtered U. Unfiltered	BOX #4: C. CLP 380 S. SW-948 W. CWA 600-series L. Low Conc. CLP	BOX #5: H. High M. Medium L. Low
--	--	--------------------------------------	--	--

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; See Note 2)	Date: Year: 19	Time	Matrix	Box #1	Box #2	Box #3	Box #4	Box #5	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis										Remarks / Comments				
											VOA-GC / MS	SV-GC / MS	Pest / PCB-GC	Herb-GC	VOA-GC	Metals	Lead	Mercury	Cyanides	Radiologicals		TOC / TOX	O&G / TPH	Phenols	Other
BC1B2202211/6	11:15	S	E	-	-	-	S	M	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	SSKEL liner 8240 VOC
BC1B1202211/6	12:00	S	E	-	-	-	S	M	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	" " "
BC1B4101211/6	15:45	S	E	-	-	-	S	L	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	" " "
BC1B2202211/6	11:15	S	E	-	-	-	C	S	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	803 jar CLP SVOC, Lead
BC1B1202211/6	12:00	S	E	-	-	-	C	S	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	" " "
BC1B4101211/6	15:45	S	E	-	-	-	C	S	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	" " "
	/	:																							
	/	:																							
	/	:																							
	/	:																							

Client's Special Instructions:			
Describe Problems, If Any:			
Lab: Received in Good Condition	Date: <u>1/7</u>	#2 Relinquished By: (Sig.)	Date:
#1 Relinquished By: (Sig.) <u>J. Bruegel</u>	Time: <u>1700</u>	Company Name:	Time:
Company Name: <u>EARTH TECH</u>	Date: <u>1/8</u>	#3 Received By: (Sig.)	Date:
#1 Received By: (Sig.) <u>Jane Landry</u>	Time: <u>830</u>	Company Name:	Time:
Company Name: <u>Compuchem</u>			
Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. Note (2): If CLP Inorganics diskette required, ID limited to maximum of six characters.			
Note (3): Samples stored 60 days after date report mailed at no extra charge. Note (4): All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.			





**1-800-833-5097**

Box #2: A. HCl  
B.  $\text{HNO}_3$   
C.  $\text{NaHSO}_4$   
D.  $\text{Na}_2\text{S}_2\text{O}_8$

E. Ice Only  
O. Other \_\_\_\_\_  
N. Not Preserved

Box #3: F. Filtered  
U. Unfiltered

Box #4: C. CLP 3/90  
S. SW-848  
W. CWA 600  
Low Conc

**Box #5:** H - High  
M - Medium  
L - Low

of 3

# CHAIN-OF-CUSTODY RECORD


# 29588 4570  
616 580-1224

Shipment to: FARGH TECH  
683 EMORY VALLEY RD  
DALLAS, TX 75246  
37830

Project Name: 110 WFG, MANG  
REMEDIAL INVEST

**Sampler Name:** J.S.B.

Carrier: **Fedex** Airbill No.: **95698**

Sampler Signature: 

Project-specific

13

**1-800-833-5097**

**BOX #1:** 1. Surface Water  
2. Ground Water  
3. Leachate  
4. Flinsate  
5. Soil / Sediment / Sludge  
6. Trip Blank  
7. Oil  
8. Waste  
9. Other \_\_\_\_\_

Box #2: A. HCl  
B.  $\text{HNO}_3$   
C.  $\text{NaHSO}_4$   
D.  $\text{Na}_2\text{S}_2\text{O}_8$

E. Ice Only  
O. Other \_\_\_\_\_  
N. Not Preserved

Box #3: F. Filtered  
U. Unfiltered

Box #4: C. CLP 3/90  
S. SW-848  
W. CWA 600  
Low Cond

M. - Medium  
L. - Low

[illegible]

**Client's Special Instructions:**

**Describe Problems, If Any:**

Lab: Received in Good Condition <input checked="" type="checkbox"/> N		Describe Problems, If Any:	
#1 Relinquished By: (Sig.)	Date: <u>11/3</u>	#2 Relinquished By: (Sig.)	
Company Name: <u>East Tech</u>	Time: <u>7:15</u>	Company Name:	
#1 Received By: (Sig.) <u>James Anderson</u>	Date: <u>11/9</u>	#2 Received By: (Sig.)	
	Time: <u>1:15</u>	Company Name:	

Date:	#3 Relinquished By: (Sig.)
Time:	Company Name:
Date:	#3 Received By: (Sig.)
Time:	Company Name:

Date:	Sample storage time requested? (In days, see Note 3 )
Time:	
Date:	DESTROY or RETURN data after five years of archival?
Time:	( Circle choice; see Note 4 )

[illegible]

**Note (1):** If "N" lab will hold samples to await remainder of project maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. **Note (2):** If OLC Hologram elements required.



COMPUCHEM  
ENVIRONMENTAL  
CORPORATION

3306 Chapel Hill/Nelson Highway  
Research Triangle Park, NC 27709

1-800-833-5097

BOX #1: 1. Surface Water  
2. Ground Water  
3. Leachate  
4. Effluent  
5. Soil / Sediment / Sludge  
6. Trip Blank  
7. Oil  
8. Waste  
9. Other

Box #2: A. HCl  
B. HNO<sub>3</sub>  
C. NaHSO<sub>4</sub>  
D. Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>  
E. Ice Only  
O. Other  
N. Not Preserved

Carrier: Airbill No.:  
Fedex 848000354

Ship to: Earth Tech

Project Name: 110MFG MIANG  
Battle Creek, Mich

Field Point-of-Contact:

Sampler Name:

Telephone No.:

Sampling for project complete? Y or N (See Note 1)  
Project-specific (PS) or Batch (B) QC: B

Box #3: R. Radiological  
T. TCLP  
O. Other  
Box #4: C. CLP 380  
S. SW-846  
W. CWA 600-series  
L. Low Conc. CLP

Box #5: H. High  
M. Medium  
L. Low

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; See Note 2)	Date: Year: 19 <u>20</u>	Time	Matrix	Box #1	Box #2	Box #3	Box #4	Box #5	No. of Bottles	Organics Analysis										Inorganics				Other	Remarks / Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
										Use for Lab QC (MS or DUP)	VOC-GC / MS	SV-GC / MS	Pest / PCB-GC	Herb-GC	VOC-GC	Metals <i>Pb only</i>	Mercury	Cyanides	Radiologicals	TOC / TOX	O&G / TPH	Phenols																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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Client's Special Instructions:

Describe Problems, if Any:

Lab: Received in Good Condition

#1 Relinquished By: (Sig.)

Date: 11/8/94

#3 Relinquished By: (Sig.)

Date:

Sample storage time requested? (In days, see Note 3)

Company Name:

Company Name:

Company Name:

Date:

DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)

#1 Received By: (Sig.)

Date: 11/8/94

#3 Received By: (Sig.)

Date:

DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)

Company Name:

Company Name:

Company Name:

Date:

DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. Note (2): If CLP Inorganics diskette required, ID limited to maximum of six characters.

Note (3): Samples stored 60 days after date report mailed at no extra charge. Note (4): All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.



COMPUCHEM  
ENVIRONMENTAL  
CORPORATION

3306 Chapel Hill/Nelson Highway  
Research Triangle Park, NC 27709

1-800-833-5097

- BOX #1: 1. Surface Water  
2. Ground Water  
3. Leachate  
4. Rinseate  
5. Soil / Sediment / Sludge
6. Trip Blank  
7. Oil  
8. Waste  
9. Other

## CHAIN-OF-CUSTODY RECORD

4577

# 29588

30F3

Ship to: EARTH TECH	Project Name: 110 MFG	Field Point-of-Contact: J. Briegel
Carrier: FedEx	Sampler Name: MANG	Telephone No.: (615) 783-9407 - 616 580-1224
Alt Bill No: 4567800354	Sampler Signature: J. Briegel	Sampling for project complete? Y or N (See Note 1)
Box #2: A. HCl B. HNO <sub>3</sub> C. NaHSO <sub>4</sub> D. Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	Box #3: F. Filtered G. Unfiltered	Project-specific (PS) or Batch (B) QC: PS
Box #2: A. HCl B. HNO <sub>3</sub> C. NaHSO <sub>4</sub> D. Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	Box #4: G. CLP 3/90 S. SW-846 W. CWA 600-series L. Low Conc. CLP	Box #5: H. High M. Medium L. Low

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; See Note 2)	Date: Year: 19 <u>99</u>	Time	Matrix	Box #1	Box #2	Box #3	Box #4	Box #5	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis										Inorganics	Other	Remarks / Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
											VOA-GC / MS	SV-GC / MS	Pest / PCB-GC	Herb-GC	VOA-GC	Metals	Mercury	Cyanides	Radiologicals	TOC / TOX				O&G / TPH	Phenols	Other																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
<del>B1B10001D</del>	<del>101117</del>	<del>09:30</del>	<del>5</del>	<del>E</del>	<del>-</del>	<del>-</del>	<del>S</del>	<del>L</del>	<del>1</del>	<del>DUP</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<del>✓</del>	<

### Client's Special Instructions:

Lab: Received in Good Condition	Date: 11/18	Describe Problems, If Any:
#1 Relinquished By: (Sig.)	Time: 1715	#2 Relinquished By: (Sig.)
Company Name: Earth Tech	Date: 1/19	Company Name:
#1 Received By: (Sig.)	Time: 2:45	#2 Received By: (Sig.)
Company Name: Compuchem	Time:	Company Name:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. Note (2): If CLP Inorganics diskette required, ID limited to maximum of six characters.

Note (3): Samples stored 60 days after date report mailed at no extra charge. Note (4): All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.

# COMPUCHEM ENVIRONMENTAL CORPORATION

3306 Chapel Hill/Nelson Highway  
Research Triangle Park, NC 27709

## CHAIN-OF-CUSTODY RECORD

29605

4579

Ship to: <b>EARTH</b> <b>TECH</b> 683 Empire Valley Rd Oak Ridge, Tenn Carrier: <b>Airbill No. 9569800391</b> Fedex		Project Name: <b>1000 Fg MANG</b> BATTLE Creek, Mich Field Point-of-Contact: <b>J. Briezel</b> Telephone No.: <b>615 483-9404</b> Sampling for project complete? <b>Y</b> or <b>N</b> (See Note 1) Project-specific (PS) or Batch (B) QC: <b>B</b>	
BOX #1: 1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil / Sediment / Sludge		BOX #2: A. HCl B. HNO <sub>3</sub> C. NaHSO <sub>4</sub> D. Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> E. Ice Only O. Other _____ N. Not Preserved	
BOX #3: F. Filtered U. Unfiltered		BOX #4: C. CLP 380 S. SW-846 W. CWA 600-series L. Low Conc. CLP	
BOX #5: H. High M. Medium L. Low			

Sample ID (Organics: 9 characters max; Inorganics: 6 characters; See Note 2)	Date: Year: 19	Time	Matrix	Box #1	Box #2	Box #3	Box #4	Box #5	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis										Inorganics										Other	Remarks / Comments						
											VOA-GC / MS	SV-GC / MS	Pest / PCB-GC	Herb-GC	VOA-GC	Metals	Mercury	Cyanides	Radiochemicals	TOC / TOX	O&G / TPH	Phenols	Other															
<del>BCGWI</del>	11/8	15:25	2	AE	-	C	M-H	2			✓																										10/92 low level	
<del>BCGWI</del>	11/8	15:25	2	E	-	C	M-H	2			✓																									10/92 low level		
<del>BCGWI</del>	11/8	15:25	2	BE	U, K	C	M	12 <sup>35</sup>									✓																			Priority poll. list plus persium		
<del>BCGWI</del>	11/8	15:25	2	BE	F	C	M	1									✓																			" " " "		
<del>BCB21012</del>	11/8	14:00	5	E	-	T	L-M	2																												Semivolatile fraction		
Note to Don Tommel - this is followup work for our July 1994 field event																																						
please call separately 948901-06; IF QA/QC is a problem call -																																						

Client's Special Instructions:	
Lab: Received in Good Condition <b>Y</b> or <b>N</b> #1 Relinquished By: (Sig.) <b>J. Briezel</b> Company Name: <b>EARTH TECH</b> #1 Received By: (Sig.) <b>Don Tommel</b> Company Name: <b>Compuchem</b>	Describe Problems, if Any: Date: <b>11/9</b> #2 Relinquished By: (Sig.) Company Name: Date: <b>11/23</b> #2 Received By: (Sig.) Company Name: Date: <b>11/30</b> #3 Relinquished By: (Sig.) Company Name: Date: <b>3/23/94</b> #3 Received By: (Sig.) Company Name:
Sample storage time requested? (In days, see Note 3) DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)	Date: Time: Date: Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.  
 Note (2): If CLP inorganics diskette required, ID limited to maximum of six characters.  
 Note (3): All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.  
 Note (4): Samples stored 60 days after date report mailed at no extra charge.







3306 Chapel Hill/Nelson Highway  
Research Triangle Park, NC 27709

# CHAIN-OF-CUSTODY RECORD

4559

29588

1 of 4

Ship to: Earth Tech 683 Emory Valley Rd Oak Ridge TN 37830		Project Name: Michigan Ave Battle Creek, MI		Field Point-of-Contact: J. Briegel	
Carder: Airbill No.: Fedex 9569800380		Sampler Name: J. Briegel		Telephone No.: (615) 483-9464	
Box #2: A. HCl B. HNO <sub>3</sub> C. NaHSO <sub>4</sub> D. Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>		Box #3: F. Filtered U. Unfiltered		Sampling for project complete? (Y) or N (See Note 1)	
Box #1: 1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil / Sediment / Sludge		Box #4: C. CLP 3/80 S. SW-846 W. CWA 600-series L. Low Conc. CLP		Project-specific (PS) or Batch (B) QC: PS	
Box #5: H - High M - Medium L - Low		Box #6: R. Radiological T. TCLP O. Other			

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; See Note 2)	Date: Year: 19	Time	Matrix	Box #1	Box #2	Box #3	Box #4	Box #5	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis										Inorganics					Remarks / Comments	
											VOA-GC / MS	SV-GC / MS	Pest / PCB-GC	Herb-GC	VOA-GC	Metals	Lead	Mercury	Cyanides	Radiologicals	TOC / TOX	O&G / TPH	Phenols	Other			
BCTB4	11/9	18:30	6	A/E	-	-	C	L	2		✓																trip blank
BCEB7	11/9	18:05	4	A/E	-	-	C	L	2		✓																rinsate from band aiger
BCEB7	11/9	18:05	4	E	-	-	C	L	2		✓																"
BCEB7	11/9	18:05	4	B/E	-	-	S	L	1							✓											"
B1B12000	11/9	14:25	5	E	-	-	S	L	1		✓						✓										8240
B1B12000	11/9	14:25	5	E	-	-	C, S	L	1		✓						✓										3/90 CLP, SW846 Pb
B1B134000	11/9	09:00	5	E	-	-	S	L	1		✓																8240
B1B134000	11/9	09:00	5	E	-	-	C, S	M	1		✓						✓										3/90 CLP, SW846 Pb
B1B134000	11/9	09:35	5	E	-	-	S	L	1		✓																8240
B1B134000	11/9	09:35	5	E	-	-	S	L	1		✓																old duplicate
B1B134000	11/9	09:35	5	E	-	-	S	L	1		✓																please sample SW 11/10/94
B1B134000	11/9	09:35	5	E	-	-	S	L	1		✓																that is for the

Lab: Received in Good Condition		Describe Problems, If Any:	
#1 Relinquished By: (Sig.)	Date: 11/9	#2 Relinquished By: (Sig.)	Date: 11/9
Company Name: Earth Tech	Time: 17:05	Company Name:	Time:
#1 Received By: (Sig.)	Date: 11/9	#2 Received By: (Sig.)	Date: 11/9
Company Name: Compuchem	Time: 07:45	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. Note (2): If CLP Inorganics diskette required, ID limited to maximum of six characters.  
Note (3): Samples stored 60 days after date report mailed at no extra charge. Note (4): All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.





3074 29588 661



3306 Chapel Hill/Nelson Highway  
Research Triangle Park, NC 27709

1-800-833-5097

CHAIN-OF-CUSTODY RECORD

Ship to: See Page 1 Project Name: See Page 1 Field Point-of-Contact: See Page 1

Carrier: See Page 1 Airbill No.: See Page 1 Telephone No.: See Page 1

Box #1: 1. Surface Water  
2. Ground Water  
3. Leachate  
4. Rinseate  
5. Soil / Sediment / Sludge

Box #2: A. HCl  
B. HNO<sub>3</sub>  
C. NaHSO<sub>4</sub>  
D. Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>

Box #3: F. Filtered  
U. Unfiltered

Box #4: C. CLP 3/90  
S. SW-846  
W. CWA 600-series  
L. Low Conc. CLP

Box #5: H. - High  
M. - Medium  
L. - Low

Sampling for project complete? Y or N (See Note 1)  
Project-specific (PS) or Batch (B) QC: \_\_\_\_\_

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; See Note 2)	Date: Year: 19	Time	Matrix	Box #1	Box #2	Box #3	Box #4	Box #5	No. of Bottles	Organics Analysis										Inorganics				Other	Remarks / Comments	
										Use for Lab OC (MS or DUP)	VOA-GC / MS	SV-GC / MS	Pest / PCB-GC	Herb-GC	VOA-GC	Metals / Lead	Mercury	Cyanides	Radiologicals	TOC / TOX	O&G / TPH	Phenols				
BIB11X923D	11/9	15:40	S	E	-	-	CS	L	1	MS/MSD	7															BIB11923 and 1811423D are field dup pair use for MS/MSD also 8240, CLP 3/90, SW846 lead 8240,
BIB11X923D	11/9	15:40	S	E	-	-	S	L	1	7																CLP 3/90 SW846 lead 8240
BIC1B90001	11/9	15:20	S	E	-	-	S	L	1	7																CLP 3/90, SW846 lead 8240
BIC1B90001	11/9	15:20	S	E	-	-	CS	L	1	7																CLP 3/90, SW846 lead 8240
BIC1B70001	11/9	14:55	S	E	-	-	S	L	1	7																CLP 3/90, SW846 lead 8240
BIC1B70001	11/9	14:55	S	E	-	-	CS	L	1	7																CLP 3/90, SW846 lead 8240
BIC1B70001	11/9	11:45	S	E	-	-	S	L	1	7																CLP 3/90, SW846 lead 8240
BIC1B70001	11/9	11:45	S	E	-	-	CS	L	1	7																CLP 3/90, SW846 lead 8240
BIC1B70001	11/9	10:50	S	E	-	-	S	L	1	7																CLP 3/90, SW846 lead 8240
BIC1B70001	11/9	10:50	S	E	-	-	CS	L	1	7																CLP 3/90, SW846 lead 8240

Client's Special Instructions: \_\_\_\_\_

Lab: Received in Good Condition Y or N \_\_\_\_\_

#1 Relinquished By: (Sig.) \_\_\_\_\_ Date: 11/16/90 Time: 11:00

Company Name: \_\_\_\_\_

#1 Received By: (Sig.) \_\_\_\_\_ Date: 11/16/90 Time: 07:45

Company Name: \_\_\_\_\_

#3 Relinquished By: (Sig.) \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

Company Name: \_\_\_\_\_

#3 Received By: (Sig.) \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

Company Name: \_\_\_\_\_

Sample storage time requested? \_\_\_\_\_ (In days, see Note 3)

DESTROY or RETURN data after five years of archival? \_\_\_\_\_ (Circle choice; see Note 4)

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. Note (2): If CLP Inorganics diskette required, ID limited to maximum of six characters.

Note (3): Samples stored 60 days after date report mailed at no extra charge. Note (4): All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.



EARTH TECH

COMPUCHEM  
ENVIRONMENTAL  
CORPORATION

3306 Chapel Hill/Nelson Highway  
Research Triangle Park, NC 27709

CHAIN-OF-CUSTODY RECORD

4542

29839

Project Name: 110<sup>th</sup> FG, MIANG, RI  
Ship to: COMPUCHEM  
3306 Chapel Hill  
RTP, NC  
Carrier: Airbill No.:  
FEDEX 3519457211  
Box #1: 1. Surface Water  
2. Ground Water  
3. Leachate  
4. Filtrate  
5. Soil / Sediment / Sludge  
6. Trip Blank  
7. Oil  
8. Waste  
9. Other  
Field blank  
Box #2: A. HCl  
B. HNO<sub>3</sub>  
C. NaHSO<sub>4</sub>  
D. Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>  
Box #3: F. Filtered  
U. Unfiltered  
Box #4: C. CLP 3/80  
S. SW-846  
W. CWA 600-series  
L. Low Conc. CLP  
Box #5: H. High  
M. Medium  
L. Low  
Field Point-of-Contact: J. BRIEGEL  
Telephone No.: (615) 483-9404  
Sampling for project complete? Y or N (See Note 1)  
Project-specific (PS) or Batch (B) QC: PS

Sample ID (Organics: 9 characters max; Inorganics: 6 characters; See Note 2)	Date: Year: 19	Time	Matrix	Box #1	Box #2	Preservative	Box #3	Box #4	Box #5	Expect. Conc.	No. of Bottles	Organics Analysis										Inorganics		Other	Remarks / Comments
												VOA-GC / MS	SV-GC / MS	Pest / PCB-GC	Herb-GC	VOA-GC	Metals	Mercury	Cyanides	Radiochemicals	TOC / TOX	O&G / TPH	Phenols	Other	
BCFB01	12/16	12:15	W	9	A	NA	DA	S	L	4		7													all waters for
BCFB01	12/16	07:50	9		E			L	L	2															SW 846 SW 80/8020
BCFB01	12/16	07:50	9		B			S	L	1															CLP 10/92 SWC low level
BCFB02	12/16	08:25	9		A			S	L	4		7													metal P.P. list plus
BCFB02	12/16	08:25	9		E			L	L	2															barium
BCFB02	12/16	08:25	9		B			S	L	1															
BCFB02	12/16	08:25	9		A			S	L	2		7													
BCFB01	12/16	16:45	G					S	L																Small volumes - SW Permit please
1M W2 20 22	12/14	13:37	5		E			S, C	M	1		7													run for 8240, CLP SWCs
1M W2 10 12	12/14	13:25	5		E			S, C	M	1		7													and (PB - trace (CP method)
																									Volys = low level - (Field SWC)
																									SWCs = med conc. - (Field SWC)
																									Pb = ? med conc

Client's Special Instructions:  
Lab: Received in Good Condition Y or N  
#1 Relinquished By: (Sig.)  
Company Name:  
#1 Received By: (Sig.)  
Company Name:  
#2 Relinquished By: (Sig.)  
Company Name:  
#2 Received By: (Sig.)  
Company Name:  
#3 Relinquished By: (Sig.)  
Company Name:  
#3 Received By: (Sig.)  
Company Name:  
Date: 12/16  
Time: 17:00  
Sample storage time requested? (In days, see Note 3)  
DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)

Note (1): If "Y" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio, if "Y" lab will begin processing batches now. Note (2): If CLP Inorganics diskette required, ID limited to maximum of six characters.  
Note (3): Samples stored 60 days after date report mailed at no extra charge. Note (4): All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.



COMPUCHEM  
ENVIRONMENTAL  
CORPORATION

3306 Chapel Hill/Nelson Highway  
Research Triangle Park, NC 27709

# CHAIN-OF-CUSTODY RECORD

4546

Ship to: EARTH TECH OAK RIDGE		Project Name: 110m FG MANG Battle Creek, Mich		Field Point-of-Contact: J. Briegel	
Carrier: FEDEX 3519457130		Sampler Name: J. Briegel		Telephone No.: 615 483-9404	
Airbill No.: 3519457130		Sampler Signature: [Signature]		Sampling for project complete? Y or N (See Note 1)	
Box #2: A. HCl B. HNO <sub>3</sub> C. NaHSO <sub>4</sub> D. Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>		Box #3: F. Filtered G. Unfiltered		Project-specific (PS) or Batch (B) QC: PS	
Box #1: 1. Surface Water 2. Ground Water 3. Leachate 4. Rinseate 5. Soil / Sediment / Sludge		Box #4: G. CLP 300 S. SW-846 W. CWA 600-series L. Low Conc. CLP		Box #5: H. High M. Medium L. Low	

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; See Note 2)	Date: Year: 19	Time	Matrix	Box #1	Box #2	Box #3	Box #4	Box #5	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis										Inorganics	Other	Remarks / Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
											Preservative	Filtered/Unfiltered	Method	Expect. Conc.	VOA-GC / MS	SV-GC / MS	Pest / PCB-GC	Herb-GC	VOA-GC	Metals				Mercury	Cyanides	Radiologicals	TOC / TOX	O&G / TPH	Phenols	Other																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
BCERD02	12/18	17:15	4	E	U	U	S	L	2	✓													8240																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								

Client's Special Instructions: BCBGSS03 and 03D are a duplicate pair - use for MS/MSD

Lab: Received in Good Condition by N		Describe Problems, If Any:	
#1 Relinquished By: (Sig.) [Signature]	Date: 12/19	#2 Relinquished By: (Sig.)	Date:
Company Name: [Signature]	Time: 1700	Company Name:	Time:
#1 Received By: (Sig.) [Signature]	Date: 12/19	#2 Received By: (Sig.)	Date:
Company Name: Compuchem	Time: 0800	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. Note (2): If CLP Inorganics diskette required, ID limited to maximum of six characters.  
Note (3): Samples stored 60 days after date report mailed at no extra charge. Note (4): All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.

# COMPUCHEM ENVIRONMENTAL CORPORATION

3306 Chapel Hill/Nelson Highway  
Research Triangle Park, NC 27709

1-800-833-5097

- BOX #1:** 1. Surface Water  
2. Ground Water  
3. Leachate  
4. Rinseate  
5. Soil / Sediment / Sludge
- BOX #2:** A. HCl  
B. HNO<sub>3</sub>  
C. NaHSO<sub>4</sub>  
D. Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>
- BOX #3:** F. Filtered  
U. Unfiltered
- BOX #4:** C. CLP 3/90  
S. SW-846  
W. CWA 600-series  
L. Low Conc. CLP
- BOX #5:** H. High  
M. Medium  
L. Low

## CHAIN-OF-CUSTODY RECORD

Ship to: **BAKTA TECH**  
**COMPUTHEM**  
**OAK RIDGE TN**

Project Name: **110<sup>th</sup> FG, MIAN, RI**

Sampler Name: **S. SMITH**

Field Point-of-Contact: **J. BRIGGLE**

Telephone No.: **(615) 483-9404**

Sampling for project complete? Y or N (See Note 1)

Project-specific (PS) or Batch (B) QC: **PS**

Sampler Signature: *San Ri*

Airbill No.: **3519457130**

Box #2: A. HCl  
B. HNO<sub>3</sub>  
C. NaHSO<sub>4</sub>  
D. Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>

Box #3: F. Filtered  
U. Unfiltered

Box #4: C. CLP 3/90  
S. SW-846  
W. CWA 600-series  
L. Low Conc. CLP

Box #5: H. High  
M. Medium  
L. Low

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; See Note 2)	Date: Year: 19	Time	Matrix	Box #1	Box #2	Box #3	Box #4	Box #5	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis										Inorganics				Other	Remarks / Comments						
											VOA-GC / MS	SV-GC / MS	Pest / PCB-GC	Herb-GC	VOA-GC	Metals	Mercury	Cyanides	Radiologicals	TOC / TOX	O&G / TPH	Phenols	Other									
BC15507	12/16	15:30	S	E	U	U	U	S	L	1	/	/																				CLP SVOC, metals r.p list plus Pb
BC15505	12/17	13:05	S	E	U	U	U	M	M	1	/	/																				CLP SVOC, metals r.p list plus Pb
BC15506	12/17	13:50	S	E	U	U	U	M	M	1	/	/																				" "
BC15507	12/17	14:15	S	E	U	U	U	M	M	1	/	/																				" "
BC15508	12/17	14:55	S	E	U	U	U	M	M	1	/	/																				" "
BC15509	12/17	15:30	S	E	U	U	U	M	M	1	/	/																				" "
BC15510	12/17	16:00	S	E	U	U	U	M	M	1	/	/																				" "
BC15511	12/17	16:30	S	E	U	U	U	M	M	1	/	/																				" "
BC15512	12/17	16:55	S	E	U	U	U	M	M	1	/	/																				" "
BC15513	12/18	09:00	S	E	U	U	U	M	M	1	/	/																				" "

**Client's Special Instructions:**

Lab: Received in Good Condition? Y or N

#1 Relinquished By: (Sig) *[Signature]* Date: *12/19* Time: *11:00*

Company Name: *COMPUTHEM*

#1 Received By: (Sig) *[Signature]* Date: *12/19* Time: *11:00*

Company Name: *COMPUTHEM*

#3 Relinquished By: (Sig) *[Signature]* Date: *12/19* Time: *11:00*

Company Name: *COMPUTHEM*

#3 Received By: (Sig) *[Signature]* Date: *12/19* Time: *11:00*

Company Name: *COMPUTHEM*

Sample storage time requested? (In days, see Note 3)

DESTROY or RETURN data after five years of archival? (Circle choice, see Note 4)

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. Note (2): If CLP Inorganics diskette required, ID limited to maximum of six characters.

Note (3): Samples stored 60 days after date report mailed at no extra charge. Note (4): All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.

#29839

2 of 4

4545



COMPUCHEM  
ENVIRONMENTAL  
CORPORATION

3306 Chapel Hill/Nelson Highway  
Research Triangle Park, NC 27709

## CHAIN-OF-CUSTODY RECORD

4574

# 29839

3 6 4

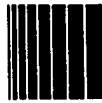
Ship to: <b>ENRTH TECH OAK RIDGE, TN</b>	Project Name: <b>10th FGS, MIANG Battle Creek, Mich</b>	Field Point-of-Contact: <b>J. Briegel</b>
Carrier: <b>FEDER 3519457130</b>	Sampler Name: <b>J. Briegel</b>	Telephone No.: <b>(615) 483-9404</b>
Box #1: 1. Surface Water 2. Ground Water 3. Leachate 4. Rinseate 5. Soil / Sediment / Sludge	Airbill No.: <b>3519457130</b>	Sampling for project complete? Y or N (See Note 1) <b>PS</b>
Box #2: A. HCl B. HNO <sub>3</sub> C. NaHSO <sub>4</sub> D. Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	Box #3: F. Filtered U. Unfiltered	Project-specific (PS) or Batch (B) QC: <b>PS</b>
Box #4: E. Ice Only O. Other N. Not Preserved	Box #5: C. CLP 300 S. SW-846 W. CWA 600-series L. Low Conc. CLP	Box #6: H. High M. Medium L. Low

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; See Note 2)	Date: Year: 19	Time	Matrix	Box #1	Box #2	Box #3	Box #4	Box #5	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis										Inorganics				Remarks / Comments
											VOA-GC / MS	SV-GC / MS	Pest / PCB-GC	Herb-GC	VOA-GC	Metals	Mercury	Cyanides	Radiologicals	TOC / TOX	O&G / TPH	Phenols	Other		
BC BG 3303	12/17	10:10	5	E	U	U	C, S	M	1	MSD	✓														CLP SVOC: p.p. list plus barium
BC BG 3304	12/17	10:35	5	E	U	U	S	L	1		✓														8240; sleeve
BC BG 3304	12/17	10:35	5	E	U	U	C, S	M	1		✓														CLP SVOC; p.p. list plus Ba
BC TB 33	12/19	14:50	6	A	U	U	C	L	2		✓														8240 - trip blank
BC BG 4050	7/12/16	15:47	5	E	U	U	C	L	1		✓														8240
BC BG 4050	7/12/16	15:47	5	E	U	U	C, S	L	1		✓														CLP, p.p. list metals plus Ba
BC BG 2050	7/12/16	14:41	5	E	U	U	C, S	L	1		✓														8240, CLP SVOC, metals
BC BG 1050	7/12/16	13:57	5	E	U	U	S	L	1		✓														8240
BC BG 1050	7/12/16	13:57	5	E	U	U	C, S	L	1		✓														CLP SVOC, metals plus Ba
BC BG 3306	7/12/16	15:30	5	E	U	U	S	L	1		✓														8240

Client's Special Instructions:	
Lab: Received in Good Condition? Y or N	
#1 Relinquished By: (Sig.)	Date: 12/19
Company Name:	Company Name:
#1 Received By: (Sig.)	Date: 12/20
Company Name:	Company Name:
#2 Relinquished By: (Sig.)	Date: 12/20
Company Name:	Company Name:
#2 Received By: (Sig.)	Date: 12/20
Company Name:	Company Name:
#3 Relinquished By: (Sig.)	Date: 12/20
Company Name:	Company Name:
#3 Received By: (Sig.)	Date: 12/20
Company Name:	Company Name:
Sample storage time requested? (In days, see Note 3)	Date: 12/20
DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)	Date: 12/20

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. Note (2): If CLP Inorganics diskette required, ID limited to maximum of six characters.  
Note (3): Samples stored 60 days after date report mailed at no extra charge. Note (4): All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.





COMPUCHEM  
ENVIRONMENTAL  
CORPORATION

3306 Chapel Hill/Nelson Highway  
Research Triangle Park, NC 27709

# CHAIN-OF-CUSTODY RECORD

Ship to: EARTH TECH OAK RIDGE, TN	Project Name: 10TH FG, MIANG BATTLE CREEK, MI	Field Point-of-Contact: J. BRIEGEL
Carrier: FED EX	Sampler Name: S. SMITH	Telephone No.: 615/483-9404
Airbill No.: 351945714	Sampler Signature: <i>[Signature]</i>	Sampling for project complete? Y or N (See Note 1)
Box #2: A. HCl B. HNO <sub>3</sub> C. NaHSO <sub>4</sub> D. Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	Box #3: F. Filtered U. Unfiltered	Project-specific (PS) or Batch (B) QC: PS H2O2P
Box #1: 1. Surface Water 2. Ground Water 3. Leachate 4. Rinsete 5. Soil / Sediment / Sludge	Box #4: C. CLP 3/90 S. SW-846 W. CWA 600-series L. Low Conc. CLP	Box #5: H. High M. Medium L. Low

1-800-833-5097

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; See Note 2)	Date: Year: 19	Time	Matrix	Box #1	Box #2	Box #3	Box #4	Box #5	No. of Bottles	Organics Analysis										Inorganics	Other	Remarks / Comments				
										Use for Lab QC (MS or DUP)	VOA-GC / MS	SV-GC / MS	Pest / PCB-GC	Herb-GC	VOA-GC	Metals	Mercury	Cyanides	Radiochemicals				TOC / TOX	O&G / TPH	Phenols	Other
BC MW1 6 GW5	12/10	10:45	2	B	F			L	1								✓									TAL METALS
BC MW1 6 GW5	12/10	10:45	2	E	U			L	1															✓		CHLORIDE/SULFATE
BC 1 MW1 6 GW5	12/10	13:23	2	A	U			L	8	MS/MSD					✓											8010/8020
BC 1 MW1 6 GW5	12/10	13:23	2	E	U			L	4	MS/MSD																LOW LEVEL CLP
BC 1 MW1 6 GW5	12/10	13:23	2	B	F			L	2	MS/MSD							✓									PP METALS + BARIUM
BC 1 MW1 6 GW5	12/10	13:23	2	A	U			L	4						✓											8010/8020
BC 1 MW1 6 GW5	12/10	13:23	2	E	U			L	2																	PP METALS + BARIUM
BC 1 MW1 6 GW5	12/10	13:23	2	B	F			L	1								✓									LOW LEVEL CLP
BC 1 MW3 GW5	12/10	14:55	2	A	U			L	4						✓											8010/8020
BC 1 MW3 GW5	12/10	14:55	2	E	U			L	2						✓											LOW LEVEL CLP

Client's Special Instructions:		Describe Problems, If Any:	
Lab: Received in good condition? Y or N	12/19	Date:	#3 Relinquished By: (Sig.)
#1 Relinquished By: <i>[Signature]</i>	12/19	Time:	Company Name:
Company Name: <i>[Signature]</i>	Date: 12/19/94	Date:	#3 Received By: (Sig.)
#1 Received By: (Sig.) <i>[Signature]</i>	Time: 0830	Time:	Company Name:
Company Name: <i>[Signature]</i>			

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. Note (2): If CLP Inorganics diskette required, ID limited to maximum of six characters.

Note (3): Samples stored 60 days after date report mailed at no extra charge. Note (4): All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.






**1-800-833-5097**

**Box #2:** A. HCl  
B.  $\text{HNO}_3$   
C.  $\text{NaHSO}_4$   
D.  $\text{Na}_2\text{S}_2\text{O}_3$

E. Ice Only  
O. Other \_\_\_\_\_  
N. Not Preserved

Project Name: 110TH FG, MIANG  
BATTLE CREEK, MI

**Sampler Name:** S. SMITH

**Sampler Signature:** 

**Box #3: F. Filtered**  
**U. Unfiltered**

C. CLP 3/90  
S. SW-846  
W. CWA 600-series  
L. Low Conc. CLP

**Box #5:** H - High  
M - Medi  
L - Low

**Field Point-of-Contact:**

Telephone No.: 615/483-9404

Sampling for project complete? Y or N (See Note 1)

Project-specific (PS) or Batch (B) QC: PS HZwp

## CHAIN-OF-CUSTODY RECORD

4567

29839

[illegible]

**Client's Special Instructions:**

**Describe Problems, If Any:**

Lab: Received in Good Condition?	or N	Describe Problems, If Any:	Date: 10/10/00	#2 Relinquished By: (Sig.)

Company Name:

Time: 1700 Company Name:

Company Name: \_\_\_\_\_  
#1 Received By: (Signature) \_\_\_\_\_

Date: 12-20-02 Received By: (Sig.)

# 1 RECEIVED BY:

Time: 1827 Company Name:

Date:	Sample storage time requested? (In days, see Note 3)
Time:	
Date:	DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)
Time:	

Company Name: W.C. Sullivan

**Note (1):** If "N" lab will hold samples to await remainder of project maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.



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# Chain of Custody Record

## *Analytical Services*

COC No.

70807  
No

[illegible]

• Materials: Water (WTR), Wastewater (WW), Soil (SOIL), Sludge (SLG), Air, Oil, Waste (WASTE)

### ESL/Content/Chain of Custody



**A Summit Company**

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# Chain of Custody Record

**Analytical Services** *Grey*

COC No.

No 69353

[illegible]

\* Matrix: Water (WTR), Wastewater (WW), Soil (SOL), Sludge (SLG), Air, Oil, Waste (WASTE)

**ASTA Marketing Chain of Command**

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# Chain of Custody Record

## *Analytical Services*

COC No.

60807

[illegible]

# Chain of Custody Record

## *Analytical Services*

COC No.

**No 70810**

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[illegible]

• **Matrix:** Water (WTR), Wastewater (WW), Soil (SOIL), Sludge (SLG), Air, Oil, Waste (WASTE)



# Chain of Custody Record

## *Analytical Services*

**COC No.**

01  
65353

[illegible]

Matr [redacted] Water [redacted] (WW [redacted] Judge [redacted] Air, [redacted] Paste [redacted] (IE)

# Chain of Custody Record

## *Analytical Services*

**COC No.**

65354

[illegible]





**WW Engineering & Science**  
A Summit Company

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# Chain of Custody Record

## Analytical Services

COC No. **112** 65355

WWES Proj. Mgr. <b>J. Briegel</b>		Project Name <b>1101 FCO, MICH ANG</b>		No. of Containers <b>2</b>		No's Correspond to Bottle Packing List		Analysis Required/Comments		For Lab Use Only	
WWES Proj. No. <b>27601.01</b>		Sampler (Print) <b>J. Briegel</b>		Sampler Signature <i>[Signature]</i>		Container Type		Sample No.		Rack/Tray No:	
Date Sampled <b>11/6</b>		Time Sampled <b>1130</b>		Matrix <b>Soil</b>		Sample Identification		Filtered Date/Time		Lab Project #	
11/6		1140		Soil		1 B 2 1 0 1 2		PID = 10 VOC, PAH/PNA			
11/6		1150		Soil		1 B 2 1 5 1 7		PID = 300 VOC, PAH/PNA			
11/6		1200		Soil		1 B 2 2 0 2 2		PID = 20 VOC, PAH/PNA			
11/6		1320		Soil		1 B 1 0 5 0 7		PID = 3.2 VOC PAH/PNA			
11/6		1350		Soil		1 B 1 1 0 1 2		PID = 9.3 VOC PAH/PNA			
11/6		1410		Soil		1 B 1 1 5 1 7		PID = 7.3 VOC PAH/PNA			
11/6		1438		Soil		1 B 1 2 0 2 2		PID = 2050 VOC PAH/PNA			
11/6		1535		Soil		1 B 4 0 5 0 7		PID = 0.6 VOC PAH/PNA			
Relinquished By: <i>[Signature]</i>		Date/Time <b>11/6/94 18:40</b>		Received By: <i>[Signature]</i>		Date/Time <b>11/6/94 18:40</b>		Logged in By: <i>[Signature]</i>		Date/Time	

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# Chain of Custody Record

## *Analytical Services*

COC No.

No 69353

[illegible]

Matrix: Water (WTR), Wastewater (WW), Soil (SOIL), Sludge (SLG), Air, Oil, Waste (WASTE)

# Chain of Custody Record

## *Analytical Services*

COC No.

No 69353

WWES Proj. Mgr.		Project Name		For Lab Use Only	
T. Briege		110th FG, MICH ANG		Rack/Tray No:	
WWES Proj. No.		Sampler (Print)		Lab Project #	
32429		T B R I E G E L			
Date Sampled		Time Sampled		Sample No.	
11/6		0900 W			
Sampler Signature		Matrix*		Analysis Required/Comments	
<i>[Signature]</i>		W		PNA 8270	
Sample Identification		No. of Containers		No's Corresponding to Bottle Packing List	
1 6 W 1 2		1		1 2 3 4 5	
				6 7 8 9 10	
				11 12 13 14 15	
				16 17 18 19 20	
				1 2 3 4 5	
				6 7 8 9 10	
				11 12 13 14 15	
				16 17 18 19 20	
				1 2 3 4 5	
				6 7 8 9 10	
				11 12 13 14 15	
				16 17 18 19 20	
				1 2 3 4 5	
				6 7 8 9 10	
				11 12 13 14 15	
				16 17 18 19 20	
				1 2 3 4 5	
				6 7 8 9 10	
				11 12 13 14 15	
				16 17 18 19 20	
				1 2 3 4 5	
				6 7 8 9 10	
				11 12 13 14 15	
				16 17 18 19 20	
				1 2 3 4 5	
				6 7 8 9 10	
				11 12 13 14 15	
				16 17 18 19 20	
				1 2 3 4 5	
				6 7 8 9 10	
				11 12 13 14 15	
				16 17 18 19 20	
				1 2 3 4 5	
				6 7 8 9 10	
				11 12 13 14 15	
				16 17 18 19 20	
				1 2 3 4 5	
				6 7 8 9 10	
				11 12 13 14 15	
				16 17 18 19 20	
				1 2 3 4 5	
				6 7 8 9 10	
				11 12 13 14 15	
				16 17 18 19 20	
				1 2 3 4 5	
				6 7 8 9 10	
				11 12 13 14 15	
				16 17 18 19 20	
				1 2 3 4 5	
				6 7 8 9 10	
				11 12 13 14 15	
				16 17 18 19 20	
				1 2 3 4 5	
				6 7 8 9 10	
				11 12 13 14 15	
				16 17 18 19 20	
				1 2 3 4 5	
				6 7 8 9 10	
				11 12 13 14 15	
				16 17 18 19 20	
				1 2 3 4 5	
				6 7 8 9 10	
				11 12 13 14 15	
				16 17 18 19 20	
				1 2 3 4 5	
				6 7 8 9 10	
				11 12 13 14 15	
				16 17 18 19 20	
				1 2 3 4 5	
				6 7 8 9 10	
				11 12 13 14 15	
				16 17 18 19 20	
				1 2 3 4 5	
				6 7 8 9 10	
				11 12 13 14 15	
				16 17 18 19 20	
				1 2 3 4 5	
				6 7 8 9 10	
				11 12 13 14 15	
				16 17 18 19 20	
				1 2 3 4 5	
				6 7 8 9 10	
				11 12 13 14 15	
				16 17 18 19	

MANURE/WATER (WTR) Wastewater (WW) Soil (SOIL) Sludge (SLG) Air, Oil, Waste (WASTE)

SLA Charter/Chain of Custody



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# Chain of Custody Record

## Analytical Services

COC No. **N2 17243**

Project Manager <b>J Briegel</b>		Project Name <b>110th FG, MICH ANG</b>		No. of Containers		No's Correspond to Bottle Packing List		Analysis Required/Comments		For Lab Use Only	
Project No. <b>27001.01</b>		Sampler (Print) <b>J Briegel</b>		Sample Identification <b>16 W 1 2</b>		Container Type				Rack/Tray No:	
Date Sampled		Time Sampled		Matrix*		Correspondence				Lab Project #	
11/6		0900		W		X		Highest Priority! VOC		Sample No.	
11/7		1430		Soil		X		PAH, VOC		Filtered Date/Time	
11/7		1610		Soil		X		PAH, VOC			
11/7		1550		Soil		X		VOC			
11/7		1445		Soil		X		PAH / VOC			
11/7		1210		Soil		X		PAH, VOC			
11/7		1140		Soil		X		PAH, VOC			
11/7		1535		Soil		X		PAH, VOC			
11/7		1110		Soil		X		PAH, VOC			
Relinquished By: <b>J. Fox</b>		Date/Time <b>11/7/94 6:30 PM</b>		Received By: <b>Don Moran</b>		Received to Lab By:		Date/Time		Logged in By:	
11/7/94		11/7/94		11/7/94							

\* Matrix: Water (WTR), Wastewater (WW), Soil (SOIL), Sludge (SLG), Air, Oil, Waste (WASTE)



EARTH T E C H

## Chain of Custody Record

Analytical Services

5555 Glenwood Hills Pkwy SE • PO Box 874 • Grand Rapids, MI 49508-0874

COC No.

N2 17044

Project Manager JBriegel		Project Name 110 <sup>th</sup> FG, MICHANG		Project No. 27001.01		Sampler (Print) J. Briegel		Sampler Signature <i>J. Briegel</i>		No. of Containers		No's Corresponding to Bottle Picking List		Analysis Required/Comments		For Lab Use Only	
Date Sampled	Time Sampled	Matrix*	Sample Identification						Container Type		Sample No.		Filtered Date/Time				
11/7	1515	Soil	1	B	8	0	5	0	7		2	1	2	3	4	5	
11/7	1035	Soil	1	B	3	0	0	0	1		2	1	2	3	4	5	
11/7	1600	W	1	B	C	E	R	4		2	1	2	3	4	5		
11/7	1050	Soil	1	B	5	1	0	1	2		2	1	2	3	4	5	
11/7	1210	Soil	1	B	5	2	5	2	7	D	2	1	2	3	4	5	
11/7	0900	Soil	1	B	2	0	0	1			2	1	2	3	4	5	
11/7	1015	Soil	1	B	5	0	5	0	7		2	1	2	3	4	5	
11/7	1335	Soil	1	B	1	2	0	5	0	7	2	1	2	3	4	5	
11/7	0930	Soil	1	B	1	0	0	0	1		2	1	2	3	4	5	
Relinquished By: <i>A. Fox</i>		Date/Time 11/7/04 6:30pm	Received By: <i>Dora Moran</i>		Received By: 11/7/04 6:30pm		Received to Lab By:		Date/Time		Logged in By:		Date/Time				

\* Matrix: Water (WTR), Wastewater (WW), Soil (SOL), Sludge (SLG), Air, Oil, Waste (WASTE)

**APPENDIX H: MONITORING WELL CONSTRUCTION  
FORMS**

## Monitoring Well Construction Log - Flush Mount

Project Name: 110TH FIGHTER GROUP, MIANG	Project Number: 948901	Date: 14 DEC 94
Well Location: SITE 1, FUEL TANK FARM	Well ID: BCI-MW1	Sheet 1 of 1
Driller: MIKE HEFFERN	Borehole Diameter (in): <del>8.25</del> 7.25	Total Depth (ft): 32
Drilling Agency: STERNS	Date Started: 13 DEC 94	Depth to Water (ft): 27.86
Drilling Equipment: CHE 550	Date Finished: 14 DEC 94	Elevation and Datum: -
Drilling Method: HOLLOW STEM AUGER	Logged by: S. SMITH	Checked by: JSA
Drilling Fluid: NA	Number of Samples:	Date: 2/19/96

## PROTECTIVE CSG

Material / Type:

Diameter:

Depth BGS: Weep Hole (Y/N)

## GUARD POSTS (Y/N)

No.: Type:

## SURFACE PAD

Composition and Size:

## RISER PIPE

Type: JOHNSON SCH 40 PVC

Diameter: 2.06 IN ID

Total Length (TOC to TOS): 21.71

Ventilated Cap (Y/N)

## GROUT

Composition and Proportions: 94 lbs PORTLAND CEMENT + 51 lbs BENTONITE

Tremied (Y/N)

Interval BGS:

## CENTRALIZERS

Depth(s) NA

## SEAL

Type: 1/4" PELLETTED BENTONITE

Source: GLOBAL DRILLING SUPPLIES

Setup / Hydration Time: 30 MIN Vol. Fluid Added 5 GAL

Tremied (Y/N)

## FILTER PACK

Type: NC-7 SILICA SAND

Amt. Used: 275 lbs

Tremied (Y/N)

Source: GLOBAL DRILLING SUPPLIES

Gr. Size Dist.: 10-20

## SCREEN

Type: JOHNSON SCH 40 PVC

Diameter: 2.06 IN ID

Slot Size and Type: 10 SLOT MILLED

Interval BGS:

## WELL FOOT (Y/N)

Interval BGS: Length:

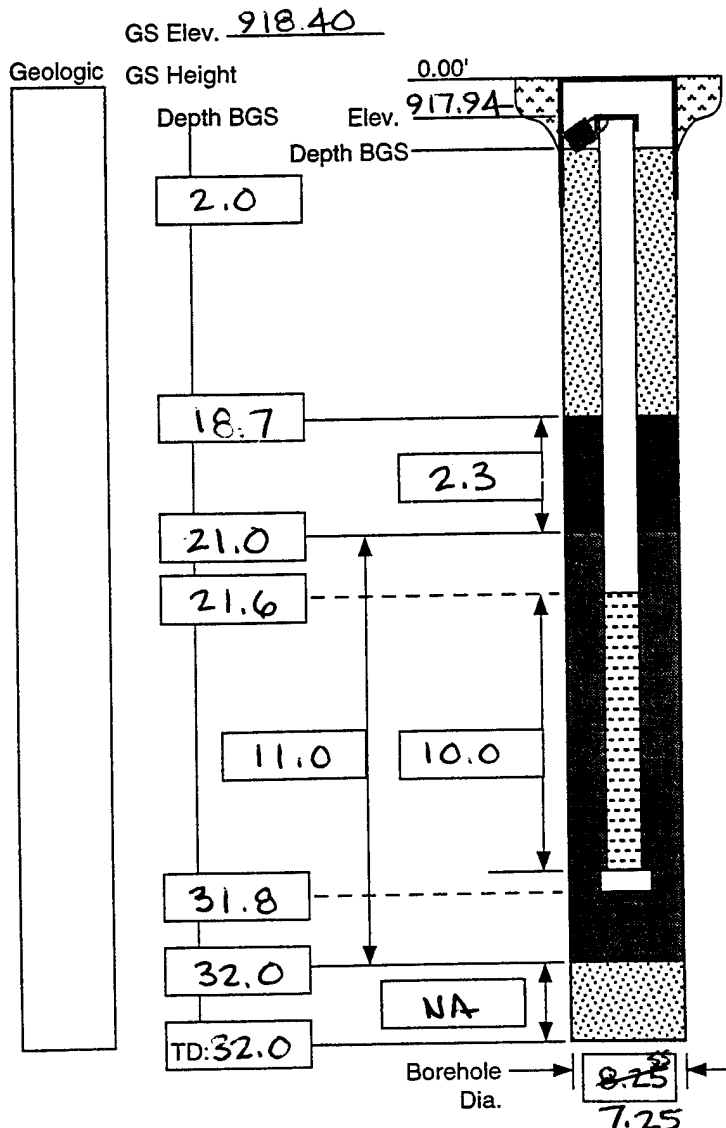
Bottom Cap (Y/N)

## BACKFILL PLUG

Material: NA

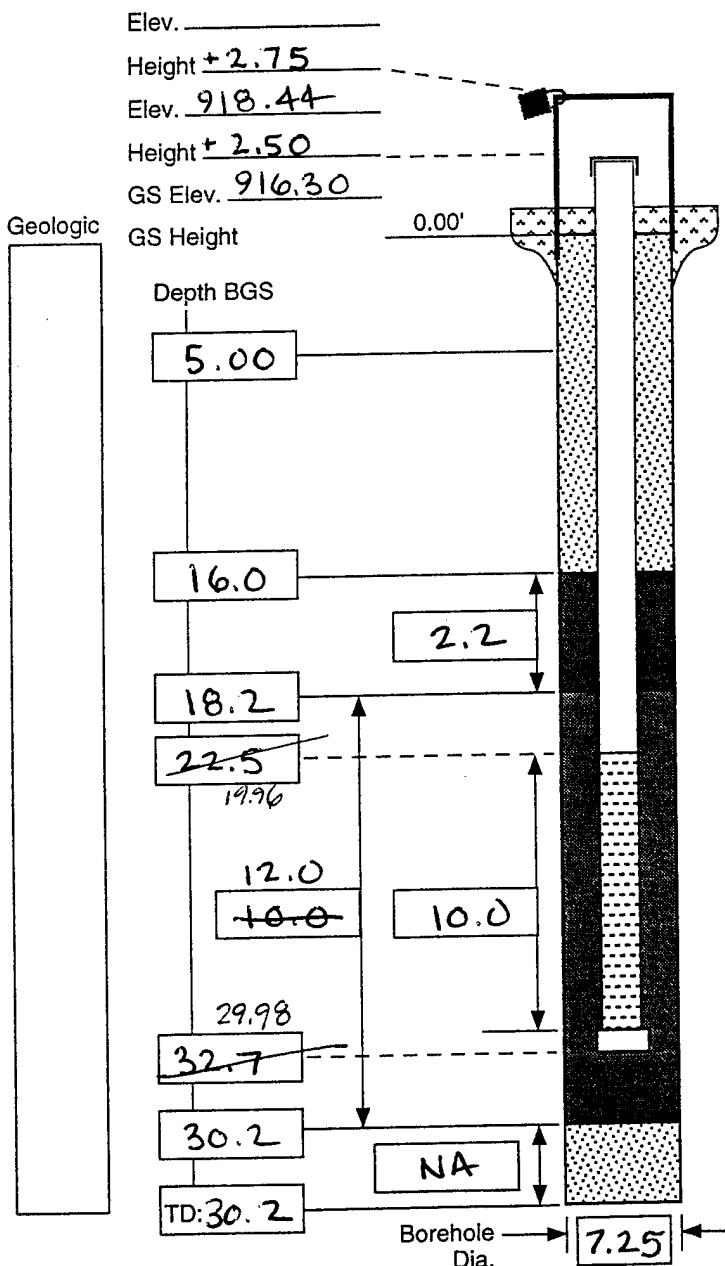
Setup / Hydration Time:

Tremied (Y/N)



# Monitoring Well Construction Log - Above Ground

Project Name: <b>110TH FIGHTER GROUP, MIANG</b>	Project Number: <b>94-901</b>	Date: <b>14 DEC 94</b>
Well Location: <b>SITE 1, FUEL TANK FARM</b>	Well ID: <b>BCI-MW2</b>	Sheet <b>1</b> of <b>2</b>
Driller: <b>MIKE HEFFERN</b>	Borehole Diameter (in): <b>7.25</b>	Total Depth (ft): <b>30.2</b>
Drilling Agency: <b>STEARNS</b>	Date Started: <b>14 DEC 94</b>	Depth to Water (ft): <b>25.65</b>
Drilling Equipment: <b>HOLLOW STEM AUGER</b>	Date Finished: <b>14 DEC 94</b>	Elevation and Datum: <b>—</b>
Drilling Method: <b>CHE 550</b>	Logged by: <b>S. SMITH</b>	Checked by: <b>JSB</b>
Drilling Fluid: <b>NA</b>	Number of Samples: <b>4</b>	Date: <b>2/19/96</b>



## PROTECTIVE CSG

Material / Type: **STEEL, SQUARE**

Diameter: **4 IN X 5 FT**

Depth BGS: **2.25** Weep Hole (Y/N) ☒

## GUARD POSTS ☒ (N)

No.: **3** Type: **STEEL W/CEMENT**

## SURFACE PAD

Composition and Size: **3' X 3' X 6" CONCRETE**

## RISER PIPE

Type: **SCH 40 PVC JOHNSON**

Diameter: **2.06 IN I.D.**

Total Length (TOC to TOS): **22.46**

Ventilated Cap (Y/N) ☒

## GROUT

Composition and Proportions: **94 lbs PORTLAND / 5 lbs BENTONITE / 5 GAL. WATER**

Tremied (Y/N) ☒

Interval BGS: **5.0 FT - 16 FT**

## CENTRALIZERS

Depth(s): **NA**

## SEAL

Type: **1/4" PELLETTED BENTONITE**

Source: **GLOBAL DRILLING SUPPLIES**

Setup / Hydration Time: **30 MIN** Vol. Fluid Added: **5 GAL**

Tremied (Y/N) ☒

## FILTER PACK

Type: **NO. 5 SILICA SAND**

Amt. Used: **300 lbs**

Tremied (Y/N) ☒

Source: **GLOBAL DRILLING SERVICE**

Gr. Size Dist.: **—**

## SCREEN

Type: **SCH 40 PVC JOHNSON**

Diameter: **2.06 IN I.D.**

Slot Size and Type: **20 SLOT MILLED**

Interval BGS: **—**

## WELL FOOT (Y/N) ☒

Interval BGS: **—** Length: **—**

Bottom Cap ☒ (N)

## BACKFILL PLUG

Material: **NA**

Setup / Hydration Time: **—**

Tremied (Y/N) ☒



## Monitoring Well Construction Log - Above Ground

Project Name: <b>110TH FIGHTER GROUP, MIANG</b>	Project Number: <b>9A892i</b>	Date: <b>15 DEC 94</b>
Well Location: <b>SITE 1, FUEL TANK FARM</b>	Well ID: <b>BCI-MW3</b>	Sheet <b>1</b> of <b>1</b>
Driller: <b>STEARNS</b>	Borehole Diameter (in): <b>7.25</b>	Total Depth (ft): <b>45.0</b>
Drilling Agency: <b>CME 550</b>	Date Started: <b>16 DEC 94</b>	Depth to Water (ft): <b>-</b>
Drilling Equipment: <b>HOLLOW STEM AUGER</b>	Date Finished: <b>16 DEC 94</b>	Elevation and Datum: <b>-</b>
Drilling Method: <b>MIKE HEFFERN</b>	Logged by: <b>SAM SMITH</b>	Checked by: <b>JSD</b>
Drilling Fluid: <b>NA</b>	Number of Samples: <b>NA</b>	Date: <b>2/17/96</b>

## PROTECTIVE CSG

Material / Type: **STEEL**Diameter: **4" x 5'**Depth BGS: \_\_\_\_\_ Weep Hole (Y/N) ☒GUARD POSTS ☒ (N)No.: **3** Type: **ROUND STEEL 7'**

## SURFACE PAD

Composition and Size: **3' x 3' x 6" CONCRETE**

## RISER PIPE

Type: **JOHNSON SCH 40 PVC**Diameter: **2.06 IN ID**Total Length (TOC to TOS): **42.34 FT**Ventilated Cap (Y/N) ☒

## GROUT

Composition and Proportions: **94 lbs PORTLAND / 5 lbs BENTONITE / ~5 GAL WATER**Tremied (Y/N) ☒Interval BGS: **36-38.55**

## CENTRALIZERS

Depth(s) **NA**

## SEAL

Type: **1/4" PELLETTED BENTONITE**Source: **GLOBAL DRILLING SUPPLIES**Setup / Hydration Time: **30 MIN** Vol. Fluid Added: **5 GAL**Tremied (Y/N) ☒

## FILTER PACK

Type: **NO. 7 SILICA SAND**Amt. Used: **150 lbs**Tremied (Y/N) ☒Source: **GLOBAL DRILLING SUPPLIES**Gr. Size Dist.: **10-20**

## SCREEN

Type: **JOHNSON SCH 40 PVC**Diameter: **2.06 IN ID**Slot Size and Type: **10 SLOT MILLED**Interval BGS: **39.80 FT - 44.80 FT**WELL FOOT (Y/N) ☒

Interval BGS: \_\_\_\_\_ Length: \_\_\_\_\_

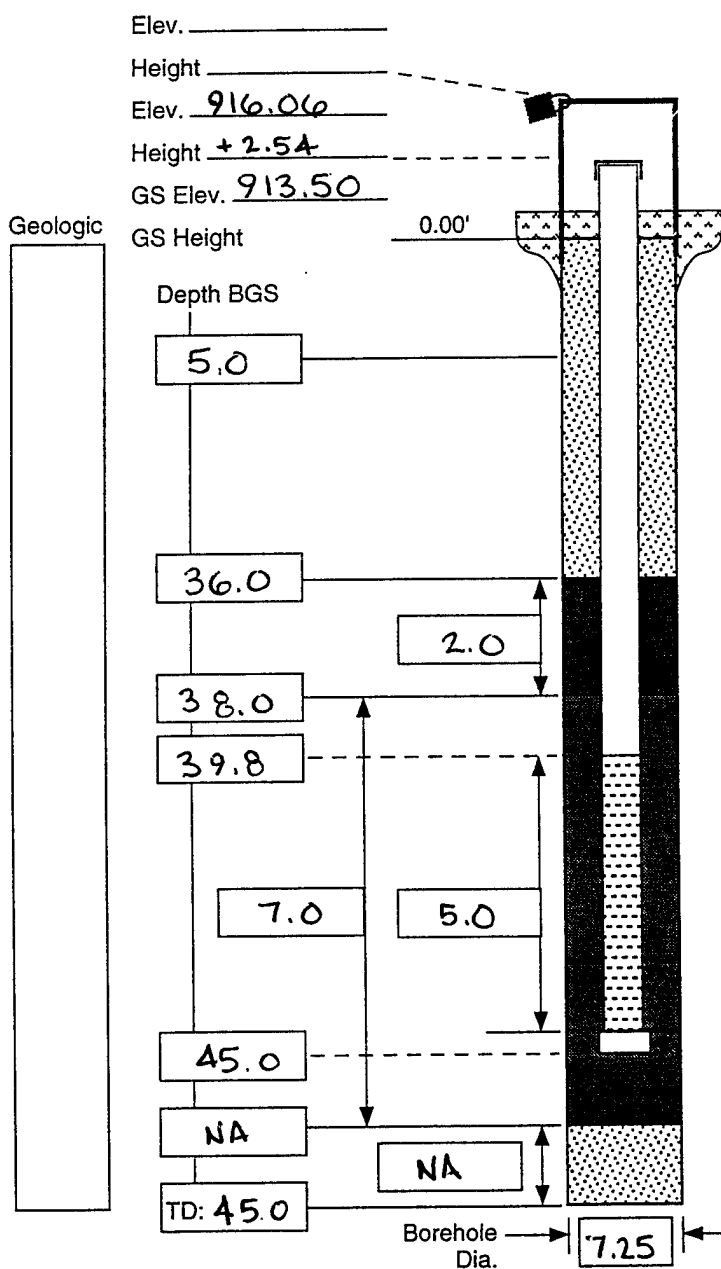
Bottom Cap ☒ (Y/N)

## BACKFILL PLUG

Material: **NA**

Setup / Hydration Time: \_\_\_\_\_

Tremied (Y/N)

Form F-1024  
9/1/91

# Monitoring Well Construction Log - Flush Mount

Project Name: <b>110TH FIGHTER GROUP, MIANG</b>	Project Number: <b>948901</b>	Date: <b>15 DEC 94</b>
Well Location: <b>PARADE GROUNDS</b>	Well ID: <b>BC-MW16</b>	Sheet <b>1</b> of <b>1</b>
Driller: <b>MIKE HEFFERN</b>	Borehole Diameter (in): <b>7.25</b>	Total Depth (ft): <b>40'</b>
Drilling Agency: <b>STEARNS</b>	Date Started: <b>15 DEC 94</b>	Depth to Water (ft): <b>32.90</b>
Drilling Equipment: <b>CHE 550</b>	Date Finished: <b>15 DEC 94</b>	Elevation and Datum: <b>-</b>
Drilling Method: <b>HOLLOW STEM AUGER</b>	Logged by: <b>SAM SMITH</b>	Checked by: <b>JSB</b>
Drilling Fluid: <b>NA</b>	Number of Samples: <b>NA</b>	Date: <b>2/19/96</b>

## PROTECTIVE CSG

Material / Type: **LOAD BEARING FLUSH MOUNT**

Diameter: \_\_\_\_\_  
Depth BGS: \_\_\_\_\_ Weep Hole (Y/N) **(N)**

## GUARD POSTS (Y/N) **(N)**

No.: \_\_\_\_\_ Type: \_\_\_\_\_

## SURFACE PAD

Composition and Size: \_\_\_\_\_

## RISER PIPE

Type: **JOHNSON SCH 40 PVC**

Diameter: **2.06 IN ID**

Total Length (TOC to TOS): **26.66 FT**

Ventilated Cap (Y/N) **(N)**

## GROUT

Composition and Proportions: **94 lbs PORTLAND / 5 lbs BENTONITE / ~5 GAL WATER**

Tremied (Y/N) **(N)**

Interval BGS: \_\_\_\_\_

## CENTRALIZERS

Depth(s) **NA**

## SEAL **1/4" PELLETTED BENTONITE**

Type: **GLOBAL DRILLING SUPPLIES**

Source: **GLOBAL DRILLING SUPPLIES**

Setup / Hydration Time: **30 MIN** Vol. Fluid Added: **SEAL**

Tremied (Y/N) **(N)**

## FILTER PACK

Type: **NO. 7 SILICA SAND**

Amt. Used: **300 lbs**

Tremied (Y/N) **(N)**

Source: **GLOBAL DRILLING SUPPLIES**

Gr. Size Dist.: **10-20**

## SCREEN

Type: **JOHNSON SCH 40 PVC**

Diameter: **2.06 IN I.D.**

Slot Size and Type: **10 SLOT MILLED**

Interval BGS: \_\_\_\_\_

## WELL FOOT (Y/N)

Interval BGS: \_\_\_\_\_ Length: \_\_\_\_\_

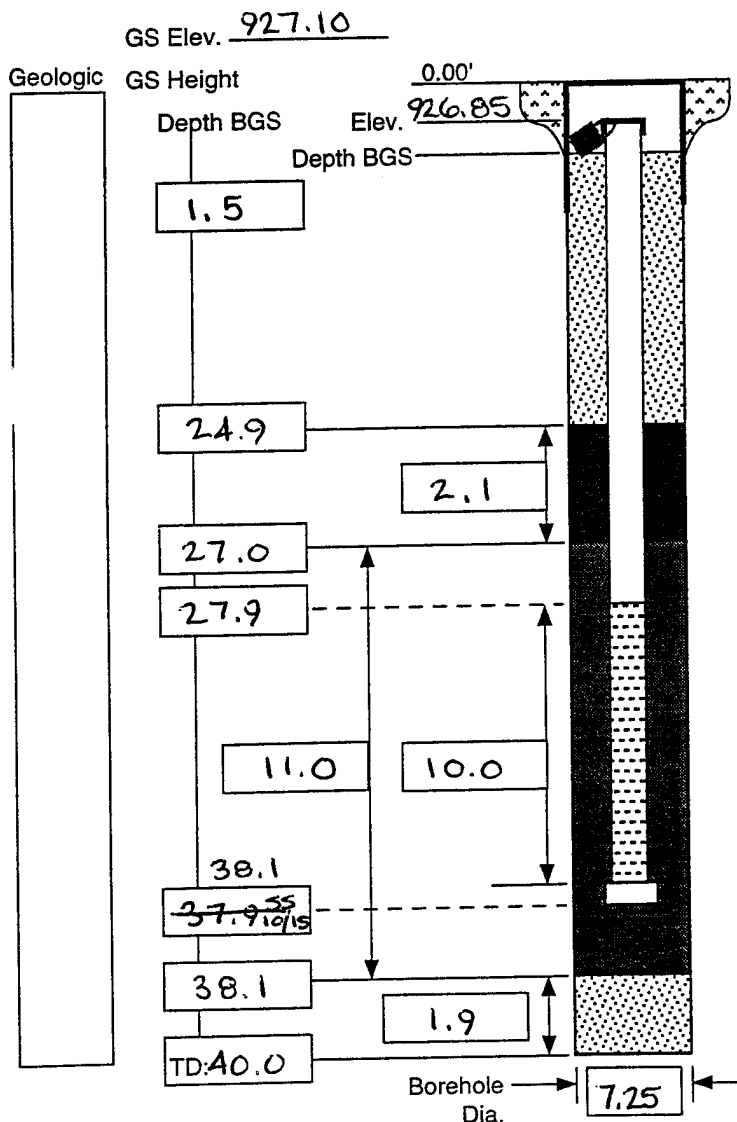
Bottom Cap (Y/N) **(N)**

## BACKFILL PLUG

Material: **HOLEPLUG**

Setup / Hydration Time: **30 MIN**

Tremied (Y/N) **(N)**



**APPENDIX I: GROUNDWATER ELEVATION DATA  
AND GROUNDWATER SAMPLING FORMS**

**Table I-1 Groundwater Elevation Measurements**  
110th FG, MIANG, Battle Creek, Michigan

	Elevation (Top of Casing)	May 25, 1994 Depth to Groundwater	May 25, 1994 Elevation of Groundwater	December 19, 1994 Depth to Groundwater	December 19, 1994 Elevation of Groundwater
BC-MW1	928.3	37.60	890.7	37.39	890.91
BC-MW2	928.37	35.40	892.97	35.17	893.20
BC-MW3	929.03	36.09	892.94	35.91	893.12
BC-MW4	929.13	37.41	891.72	37.26	891.87
BC-MW5	923.60	34.44	889.16	34.24	889.36
BC-MW6	918.52	31.41	887.11	31.12	887.40
BC-MW7	925.71	41.04	884.67	41.21	884.50
BC-MW8	917.16	30.38	886.78	30.61	886.55
BC-MW9	894.38	6.01	888.37	5.97	888.41
BC-MW11	921.09	23.42	897.67	23.27	897.82
BC-MW12	922.32	24.77	897.55	24.62	897.70
BC-MW13	928.40	37.50	890.90	37.46	890.94
BC-MW14	918.89	31.62	887.27	31.42	887.47
BC-MW15	926.68	42.06	884.62	42.21	884.47
BC2-MW1	915.43	26.00	889.43	25.74	889.69
BC3-MW1	923.16	30.86	892.30	30.88	892.28
BC3-MW2	920.73	29.04	891.69	29.10	891.63
BC3-MW3	920.30	29.65	890.65	28.70	891.60
BC3-MW4	920.42	29.34	891.08	29.38	891.04
BC3-MW5	920.28	29.53	890.75	29.58	890.70
BC3-MW6	913.42	23.80	889.62	23.87	889.55
BC4-MW1	917.12	17.42	899.70	17.46	899.66
BC4-MW2	906.39	8.04	898.35	8.69	897.70

**Table I-1 Groundwater Elevation Measurements**  
110th FG, MIANG, Battle Creek, Michigan

	Elevation (Top of Casing)	May 25, 1994 Depth to Groundwater	May 25, 1994 Elevation of Groundwater	December 19, 1994 Depth to Groundwater	December 19, 1994 Elevation of Groundwater
BC4-MW3	907.02	12.81	894.21	12.90	894.12
BC4-MW4	915.69	22.58	893.11	22.67	893.02
BC5-MW1	901.81	13.17	888.64	13.15	888.66
BC6-MW1	921.89	30.63	891.26	30.58	891.31
BC6-MW2	918.29	27.29	891.00	27.23	891.06
BC6-MW3	919.51	28.25	891.26	28.21	891.30
MW101	901.71	24.56	877.15	Not Measured	-
MW102	901.48	24.48	877.00	Not Measured	-
MW103	901.14	25.92	875.22	Not Measured	-
MW104	891.86	15.92	876.00	Not Measured	-
MW105	891.71	14.87	876.84	Not Measured	-
MW106	894.30	21.26	873.04	Not Measured	-
MW107	894.69	21.42	873.27	Not Measured	-
BC-MW16	926.85	Not Installed	-	32.63	894.22
BC1-MW1	917.94	Not Installed	-	27.22	890.72
BC1-MW2	918.44	Not Installed	-	27.95	890.49
BC1-MW3	916.06	Not Installed	-	26.78	889.28

All numbers are in feet; elevations are in feet above mean sea level.



# Groundwater Sampling Record







## Well Development/Purge Log

Project Name <u>110TH FG, MIANG</u>		Project No. <u>948901</u>	
EID/FID Readings <u>0.0 PPM</u> (Ambient)		<u>0.0 PPM</u> (Well Mouth)	
Static Levels <u>NA</u> (Product)		<u>37.23 ft (TDC)</u> (Water)	
Pump <input type="checkbox"/> / Bail <input checked="" type="checkbox"/> Rate _____		Total Gal. Extracted _____	
Water Column Length <u>13.27 FT</u>		Well Volumes Extracted <u>3</u>	
Disposition of Discharge Water <u>NALGENE HOLDING TANK AT DECON AREA</u>			
Specific Capacity <u>2.12 GAL</u>		(gpm/ft. drawdown) After _____ Hrs. _____	
New Volume _____			

[illegible]

Notes: 1 ft length of 4" = 0.087 ft<sup>3</sup> or 0.65 gal

1 ft length of 2" = 0.022 ft<sup>3</sup> or 0.16 gal

Recorded By Sam Sui Date 17 DEC 94 Form F-1003

Checked By	Date
	9/1/91

Form F-1003

9/1/91

## Well Development/Purge Log

Page 1 of 1

Project Name 110<sup>th</sup> FE, MIANG Project No. 948901-08

☒ PID/FID Readings c.c. (Ambient) 5.1 (Well Mouth)

Static Levels NA (Product) 32.6 (Water)

Pump ☐ /Bail ☒ Rate \_\_\_\_\_ Total Gal. Extracted 15

Water Column Length 4.3 Well Volumes Extracted 21.3

Disposition of Discharge Water \_\_\_\_\_

1 well volume = 0.688 gallons

Specific Capacity \_\_\_\_\_ (gpm/ft. drawdown) After \_\_\_\_\_ Hrs.

Well Information

Number	BCM W16
Location	Parade Grounds
Datum	
Elev. Datum Point	
Ground Elev.	
Well Diameter	2.06 in
Well Depth	36.9 ft
Well Material	PVC

Equipment Information

Bailer No.	NA
Pump No.	NA
Interface Probe No.	NA
Sounder No.	22324
pH Meter No.	9309
Conductivity Meter No.	9309
Thermometer No.	9309

[illegible]

Notes: 1 ft length of 4" = 0.087 ft<sup>3</sup> or 0.65 gal

1 ft length of 2" = 0.022 ft<sup>3</sup> or 0.16 gal

Recorded By Q. Fox

Date 12-17-94

Checked By

Date 6/5/93

Form F-1003  
9/1/91



Notes: 1 ft length of 4" = 0.087 ft<sup>3</sup> or 0.65 gal  
1 ft length of 2" = 0.022 ft<sup>3</sup> or 0.16 gal

Recorded By A. Fox

Checked By JSB

Date 12-18-94 Form F-1003

16/16

## Well Development/Purge Log

Project Name <u>110<sup>TH</sup> FG, MIANG</u>		Project No. <u>9A28901</u>	
PID/FID Readings <u>0.0 PPM</u>	(Ambient)	<u>0.0 PPM</u>	(Well Mouth)
Static Levels <u>NA</u>	(Product)	<u>25.6A</u>	(Water)
Pump <input type="checkbox"/> / Bail <input checked="" type="checkbox"/> Rate _____	Total Gal. Extracted _____		
Water Column Length <u>13.59</u>	Well Volumes Extracted _____		
Disposition of Discharge Water _____			
Specific Capacity <u>2.17 GAL</u>		(gpm/ft. drawdown) After _____ Hrs.	

[illegible]

Notes: 1 ft length of 4" = 0.087 ft<sup>3</sup> or 0.65 gal  
1 ft length of 2" = 0.022 ft<sup>3</sup> or 0.16 gal

Recorded By S. Smith Date 6/3/95

Checked By JSB Date 6/3/95

Form F-1003 9/1/91

Project Name 110<sup>th</sup> F6, MIAN6 Project No. 948901-08

☒ PID/FID Readings 0.0 (Ambient) 0.3 (Well Mouth)

Static Levels NA (Product) 27.2 (Water)

Pump ☐ /Bail ☒ Rate \_\_\_\_\_ Total Gal. Extracted 15

Water Column Length 4.8 Well Volumes Extracted 19.5

Disposition of Discharge Water cloudy, no odor

i well volume = 0.77 gallons

Specific Capacity \_\_\_\_\_ (gpm/ft. drawdown) After \_\_\_\_\_ Hrs. \_\_\_\_\_

Well Information

Number	BC1 MW1
Location	Parking Lot
Datum	
Elev. Datum Point	
Ground Elev.	
Well Diameter	2.06 in
Well Depth	32 ft
Well Material	PVC

Equipment Information

Baller No. NA

Pump No. NA

Interface Probe No. NA

Sounder No. 22329

pH Meter No. 9209

Conductivity Meter No. 9209

Thermometer No. 9209

[illegible]

Notes: 1 ft length of 4" = 0.087 ft<sup>3</sup> or 0.65 gal  
1 ft length of 2" = 0.022 ft<sup>3</sup> or 0.16 gal

Recorded By A. Fox Date 12-17-94 Form F-1003  
9/1/91



Checked By JSB



## Well Development/Purge Log

Project Name	110 <sup>th</sup> FC, MIANÉ	Project No.	948901-08
(PID)FID Readings	0.0	(Ambient)	
Static Levels	N/A	(Product)	0.1
Pump <input type="checkbox"/> / Bail <input checked="" type="checkbox"/> Rate	N/A	Total Gal. Extracted	50
Water Column Length	20.34	Well Volumes Extracted	15.0
Disposition of Discharge Water <u>Cloudy, no odor</u>			
<u>Well volume = 3.33 gallons</u>			
Specific Capacity		(gpm/ft. drawdown) After	Hrs.

[illegible]

Notes: 1 ft length of 4" = 0.087 ft<sup>3</sup> or 0.65 gal

1 ft length of 2" = 0.022 ft<sup>3</sup> or 0.16 gal

Recorded By Q. Fox

Checked By

Date 12-17-94

9/1/91

Form F-1003

# GROUNDWATER SAMPLING

Sample ID: BC-MW1-GW4

PROJECT NAME 110<sup>th</sup> FG MIANG JOB NO: 948901 DATE: 5/19/94  
 WELL NO. BC-MW1 LOCATION Base boundary  
 WEATHER CONDITIONS warm, clear AMBIENT TEMP: 60°  
 PERSONNEL Carol Frye/Jack Briegel  
 REVIEWED BY: PHC 6/9/94

EQUIPMENT USED: See below

## PURGING DEVICE

Type Device? Teflon bailer  
 How was the device decontaminated? see SOPs  
 How was the line decontaminated? N/A  
 Which well was previously purged? \_\_\_\_\_

## SAMPLING DEVICE

Type Device? Teflon bailer  
 How was the device decontaminated? see SOPs  
 How was the line decontaminated? N/A  
 Which well was previously sampled? BC-MW2

## INITIAL WELL VOLUME

Well diameter (in.) 2"  
 Stickup (ft.) ~ 2'  
 Depth to bottom of well (ft.) 47' (49' BDC)  
 Depth to water surface (ft.) 37.66'  
 Length of water (ft.) 11.44'  
 Volume of water (ft<sup>3</sup>) \_\_\_\_\_  
 (gal.) 1.8 gal  
 Amount of sediment at bottom of well (ft.) 1.8 x 2 = purge 7.2 gal  
 LNAPL (ft.) \_\_\_\_\_ DNAPL (ft.) \_\_\_\_\_

## PURGING

Time started 1005 Finished 1055  
 Volume purged 7 gal  
 Comments on Well Recovery \_\_\_\_\_  
 Additional Comments \_\_\_\_\_  
 Samples Collected: Start 1445  
 Finish NA

## IN-SITU TESTING

	Date: <u>5-19-93</u>	<u>5-19</u>	<u>5-19</u>				
Time:	<u>1003</u>	<u>1057</u>	<u>1420</u>				
Water Level	<u>37.66</u>	<u>37.5</u>	<u>37.6</u>				
Well Volume Purged (gal.)	<u>0</u>	<u>7</u>	<u>-</u>				
Turbidity	<u>clear</u>	<u>turbid</u>	<u>-</u>				
Odor	<u>-</u>	<u>-</u>	<u>-</u>				
Organic Vapor (ppm)	<u>NA</u>	<u>NA</u>	<u>NA</u>				
pH (units)	<u>7.61</u>	<u>7.76</u>	<u>NA</u>				
Conductivity (μ mhos)	<u>583</u>	<u>545</u>	<u>NA</u>				
Water Temperature (°F)	<u>67.3</u>	<u>77.1</u>	<u>NA</u>				

Notes: 1 ft. length of 4" = 0.087 ft<sup>3</sup> or 0.65 gal. 1 ft. length 2" = 0.022 ft<sup>3</sup> or 0.16 gal.  
 Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91



# GROUNDWATER SAMPLING

Sample ID: BC-MW2-GW4

PROJECT NAME 110th FG MIANG JOB NO: 948901 DATE: 5/19/94  
 WELL NO. BC-MW2 LOCATION Base Boundary  
 WEATHER CONDITIONS clear AMBIENT TEMP: 60-65°  
 PERSONNEL Carol Inye/Jack Briezel  
 REVIEWED BY: PH Lay 6/9/94

EQUIPMENT USED: see below

## PURGING DEVICE

Type Device? Teflon bailer  
 How was the device decontaminated? see SOPs  
 How was the line decontaminated? N/A  
 Which well was previously purged? none

## SAMPLING DEVICE

Type Device? Teflon bailer  
 How was the device decontaminated? see SOP  
 How was the line decontaminated? N/A  
 Which well was previously sampled? none

## INITIAL WELL VOLUME

Well diameter (in.) 2"  
 Stickup (ft.) ~ 2'  
 Depth to bottom of well (ft.) 46' (~48' bbl)  
 Depth to water surface (ft.) 35.42  
 Length of water (ft.) 12.58'  
 Volume of water (ft<sup>3</sup>) 2 gallons  
 (gal.)  
 Amount of sediment at bottom of well (ft.) 2 x 4 = purged 8 gallons  
 LNAPL (ft.) — DNAPL (ft.) —

## PURGING

Time started 0855 Finished 0915  
 Volume purged 8  
 Comments on Well Recovery —  
 Additional Comments water clear at beginning - became turbid  
 Samples Collected: Start 1215 Finish N/A

## IN-SITU TESTING

Date:	5-19-94	5-19	5-19				
Time:	0850	0918	1015				
Water Level	35.42	35.4'	35.4				
Well Volume Purged (gal.)	0	8	—				
Turbidity	clear	turbid	—				
Odor	none	none	—				
Organic Vapor (ppm)	—	—	—				
pH (units)	7.62	7.81	NA				
Conductivity (μ mhos)	556	525	NA				
Water Temperature (°F)	58.9	61.6	NA				

Notes: 1 ft. length of 4" = 0.087 ft<sup>3</sup> or 0.65 gal. 1 ft. length 2" = 0.022 ft<sup>3</sup> or 0.16 gal.  
 Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91

# GROUNDWATER SAMPLING

Sample ID: BC-mw3-gw4

PROJECT NAME 110th FG MIANG JOB NO: 948901 DATE: 5/19/94  
 WELL NO. BC-MW3 LOCATION Base boundary  
 WEATHER CONDITIONS clear AMBIENT TEMP: 70°  
 PERSONNEL Carol Frye / Jack Briegel  
 REVIEWED BY: PA Lag 6/9/94

EQUIPMENT USED: See below

## PURGING DEVICE

Type Device? red. - flo 2 pump  
 How was the device decontaminated? see SOPs  
 How was the line decontaminated? N/A  
 Which well was previously purged? BC-mw13

## SAMPLING DEVICE

Type Device? Teflon Bailer  
 How was the device decontaminated? see SOPs  
 How was the line decontaminated? N/A  
 Which well was previously sampled? BC-mw13

## INITIAL WELL VOLUME

Well diameter (in.) 2"  
 Stickup (ft.) ~2'  
 Depth to bottom of well (ft.) 48'  
 Depth to water surface (ft.) 37.43  
 Length of water (ft.) 10.57  
 Volume of water (ft<sup>3</sup>) —  
 (gal.) 1.69  
 Amount of sediment at bottom of well (ft.) —  
 LNAPL (ft.) — DNAPL (ft.) —

## PURGING

Time started 0740 Finished 0800  
 Volume purged ~10  
 Comments on Well Recovery —  
 Additional Comments —  
 Samples Collected: Start 1045 Finish 1110

## IN-SITU TESTING

Date:	5/20/94	5/20/94	5/20/94				
Time:	<u>0740</u>	<u>—</u>	<u>1045</u>				
Water Level	<u>37.43</u>	<u>—</u>	<u>—</u>				
Well Volume Purged (gal.)	<u>0</u>	<u>~10</u>	<u>—</u>				
Turbidity	<u>clear</u>	<u>—</u>	<u>—</u>				
Odor	<u>none</u>	<u>—</u>	<u>—</u>				
Organic Vapor (ppm)	<u>—</u>	<u>—</u>	<u>—</u>				
pH (units)	<u>4.53</u>	<u>4.40</u>	<u>—</u>				
Conductivity (μ mhos)	<u>863</u>	<u>788</u>	<u>—</u>				
Water Temperature (°C)	<u>54.3</u>	<u>55.1</u>	<u>—</u>				

Notes:

1 ft. length of 4"

= 0.087 ft<sup>3</sup> or 0.65 gal.

1 ft. length 2" = 0.022 ft<sup>3</sup> or 0.16 gal

Turbidity choices:

clear, turbid, opaque

Revision Date: 2-8-91

# GROUNDWATER SAMPLING

Sample ID: BC-MW4-GW4

PROJECT NAME 110th FG, MIANG JOB NO: 948901 DATE: 5/23/94  
 WELL NO. BC-MW4 LOCATION Base boundary  
 WEATHER CONDITIONS ptly cloudy AMBIENT TEMP: 60°  
 PERSONNEL JSB/CMT  
 REVIEWED BY: PHL Long 6/9/94

EQUIPMENT USED: rediflo 2 pump/bailer

## PURGING DEVICE

Type Device? rediflo 2 pump  
 How was the device decontaminated? see SOP  
 How was the line decontaminated? see SOP  
 Which well was previously purged? BC-MW14

## SAMPLING DEVICE

Type Device? Teflon bailer  
 How was the device decontaminated? see SOP  
 How was the line decontaminated? NA  
 Which well was previously sampled? BC-MW14

## INITIAL WELL VOLUME

Well diameter (in.) 2"  
 Stickup (ft.) ~2'  
 Depth to bottom of well (ft.) 49.2  
 Depth to water surface (ft.) 37.43  
 Length of water (ft.) 11.77  
 Volume of water (ft<sup>3</sup>) 7.5 gallons  
 (gal.)  
 Amount of sediment at bottom of well (ft.) —  
 LNAPL (ft.) — DNAPL (ft.) —

## PURGING

Time started 753 Finished 0801  
 Volume purged ~7.5 gallons  
 Comments on Well Recovery —  
 Additional Comments —  
 Samples Collected: Start — Finish 0810

## IN-SITU TESTING

	Date: <u>5/23</u>	<u>5/23</u>	<u>5/23</u>				
Time:	<u>0753</u>	<u>0801</u>	<u>0810</u>				
Water Level	<u>37.43</u>	<u>—</u>	<u>—</u>				
Well Volume Purged (gal.)	<u>0</u>	<u>~7.5</u>	<u>—</u>				
Turbidity	<u>sl. turbid</u>	<u>clear</u>	<u>—</u>				
Odor	<u>none</u>	<u>none</u>	<u>—</u>				
Organic Vapor (ppm)	<u>—</u>	<u>—</u>	<u>—</u>				
pH (units)	<u>6.01</u>	<u>5.63</u>	<u>—</u>				
Conductivity (μ mhos)	<u>1052</u>	<u>1140</u>	<u>—</u>				
Water Temperature (°C)	<u>60.8</u>	<u>57.6</u>	<u>—</u>				

Notes:

1 ft. length of 4"

= 0.087 ft<sup>3</sup> or 0.65 gal.

1 ft. length 2" = 0.022 ft<sup>3</sup> or 0.16 gal

Turbidity choices:

clear, turbid, opaque

Revision Date: 2-8-91

# GROUNDWATER SAMPLING

Sample ID: BC-MW5-GW

PROJECT NAME 110th Fb MIANG JOB NO: 948901 DATE: 5/23/94  
 WELL NO. BC-MW5 LOCATION Base boundary  
 WEATHER CONDITIONS clear/pty cldy AMBIENT TEMP: 70°  
 PERSONNEL CMF/JSB  
 REVIEWED BY: PHLag 6/9/94

EQUIPMENT USED: pump/bailer

## PURGING DEVICE

Type Device? radi flo 2 pump  
 How was the device decontaminated? see SOPs  
 How was the line decontaminated? see SOPs  
 Which well was previously purged? BC-MW4

## SAMPLING DEVICE

Type Device? Teflon bailer  
 How was the device decontaminated? see SOPs  
 How was the line decontaminated? NA  
 Which well was previously sampled? BC-MW4

## INITIAL WELL VOLUME

Well diameter (in.) 2"  
 Stickup (ft.) ~2'  
 Depth to bottom of well (ft.) ~45.0  
 Depth to water surface (ft.) 34.39  
 Length of water (ft.) 10.71  
 Volume of water (ft<sup>3</sup>) 1.71 gallon x  
 (gal.) 4 = ~7  
 Amount of sediment at bottom of well (ft.) —  
 LNAPL (ft.) — DNAPL (ft.) —

## PURGING

Time started 1000 Finished 1009  
 Volume purged 7 gallons  
 Comments on Well Recovery —  
 Additional Comments —  
 Samples Collected: Start 1025  
 Finish —

## IN-SITU TESTING

	Date: <u>5/23</u>	Date: <u>5/23</u>	Date: <u>5/23</u>				
	Time: <u>1000</u>	Time: <u>1009</u>	Time: <u>1025</u>				
Water Level	<u>34.39</u>	<u>—</u>	<u>—</u>				
Well Volume Purged (gal.)	<u>0</u>	<u>~5.7</u>	<u>—</u>				
Turbidity	<u>st. turbid</u>	<u>clear</u>	<u>clear</u>				
Odor	<u>—</u>	<u>—</u>	<u>—</u>				
Organic Vapor (ppm)	<u>—</u>	<u>—</u>	<u>—</u>				
pH (units)	<u>6.71</u>	<u>7.57</u>	<u>8.35</u>				
Conductivity (μ mhos)	<u>1036</u>	<u>1024</u>	<u>1082</u>				
Water Temperature (°C)	<u>65.3</u>	<u>60.1</u>	<u>66.3</u>				

Notes:

1 ft. length of 4"

= 0.087 ft<sup>3</sup> or 0.65 gal.

1 ft. length 2" = 0.022 ft<sup>3</sup> or 0.16 gal

Turbidity choices:

clear, turbid, opaque

Revision Date: 2-8-91

# GROUNDWATER SAMPLING

Sample ID: BC-MW6-6W4

PROJECT NAME 110th FG MIANG JOB NO: 948901 DATE: 5/22/94  
 WELL NO. BC-MW6 LOCATION base boundary  
 WEATHER CONDITIONS clear AMBIENT TEMP: 85°  
 PERSONNEL JSB/CMF  
 REVIEWED BY: PHL/eg 6/9/94  
 EQUIPMENT USED: Teflon bailer / redi-flo 2

## PURGING DEVICE

Type Device? redi-flo 2 pump  
 How was the device decontaminated? see SOPs  
 How was the line decontaminated? see SOPs  
 Which well was previously purged? BC-MW12

## SAMPLING DEVICE

Type Device? Teflon bailer  
 How was the device decontaminated? see SOPs  
 How was the line decontaminated? na  
 Which well was previously sampled? BC-MW12

## INITIAL WELL VOLUME

Well diameter (in.) 2"  
 Stickup (ft.) ~2'  
 Depth to bottom of well (ft.) 43.2  
 Depth to water surface (ft.) 31.45  
 Length of water (ft.) 11.75  
 Volume of water (ft<sup>3</sup>) —  
 (gal.) 1.87 gallons  
 Amount of sediment at bottom of well (ft.) —  
 LNAPL (ft.) — DNAPL (ft.) —

## PURGING

Time started 1415 Finished 1423  
 Volume purged ~8 gallons  
 Comments on Well Recovery —  
 Additional Comments —  
 Samples Collected: Start 1447  
 Finish —

## IN-SITU TESTING

	Date: <u>5/22/94</u>	Date: <u>5/22/94</u>	Date: <u>5/22/94</u>				
Time:	<u>1415</u>	<u>1423</u>	<u>1447</u>				
Water Level	<u>31.45</u>	<u>—</u>	<u>31.45</u>				
Well Volume Purged (gal.)	<u>0</u>	<u>8</u>	<u>—</u>				
Turbidity	<u>sl. turbid</u>	<u>clear</u>	<u>sl. turbid</u>				
Odor	<u>none</u>	<u>none</u>	<u>none</u>				
Organic Vapor (ppm)	<u>—</u>	<u>—</u>	<u>—</u>				
pH (units)	<u>7.64</u>	<u>6.82</u>	<u>—</u>				
Conductivity (μ mhos)	<u>601</u>	<u>639</u>	<u>—</u>				
Water Temperature (°C)	<u>24.3</u>	<u>62.9</u>	<u>—</u>				

Notes:

1 ft. length of 4"

= 0.087 ft<sup>3</sup> or 0.65 gal.

1 ft. length 2" = 0.022 ft<sup>3</sup> or 0.16 gal

Turbidity choices:

clear, turbid, opaque

Revision Date: 2-8-91

Well was resampled

5/24/94

The Earth Technology  
Corporation

## GROUNDWATER SAMPLING

Sample ID: 5/20/94

PROJECT NAME <u>110th FG, MIANG</u>		JOB NO: <u>948901</u>		DATE: <u>BC-MW7-GW4</u>		
WELL NO. <u>BC-MW7</u>		LOCATION <u>Battle Creek, Michigan</u>				
WEATHER CONDITIONS <u>clear</u>		AMBIENT TEMP: <u>75°</u>				
PERSONNEL <u>Mark Christenson / J Briegel</u>						
REVIEWED BY: <u>PH Lang</u> <u>6/9/94</u>						
EQUIPMENT USED: <u>Red. Flo 2 pump, bailer</u>						
PURGING DEVICE			SAMPLING DEVICE			
Type Device? <u>RediFlo 2 pump</u>			Type Device? <u>Teflon bailer</u>			
How was the device decontaminated? <u>See SOPs</u>			How was the device decontaminated? <u>See SOPs</u>			
How was the line decontaminated? <u>see SOPs</u>			How was the line decontaminated? <u>N/A</u>			
Which well was previously purged? <u>—</u>			Which well was previously sampled? <u>N/A</u>			
INITIAL WELL VOLUME			PURGING			
Well diameter (in.) <u>2'</u>			Time started <u>1047</u> Finished <u>1056</u>			
Stickup (ft.) <u>~ 2'</u>			Volume purged <u>~ 8 gallons</u>			
Depth to bottom of well (ft.) <u>~ 52.7'</u>			Comments on Well Recovery <u>—</u>			
Depth to water surface (ft.) <u>41.02</u>			Additional Comments <u>well cleaned up</u>			
Length of water (ft.) <u>11.68'</u>			<u>during purging - very</u>			
Volume of water (ft <sup>3</sup> ) <u>1.85 gallons</u>			<u>silty during sampling</u>			
(gal.) <u>—</u>			Samples Collected: Start <u>1405</u>			
Amount of sediment at bottom of well (ft.) <u>N/A</u>			Finish <u>—</u>			
LNAPL (ft.) <u>—</u> DNAPL (ft.) <u>—</u>						
IN-SITU TESTING						
Date:	<u>5/20/94</u>	<u>5/20/94</u>	<u>5/20/94</u>	<u>5/20/94</u>	<u>—</u>	<u>—</u>
Time:	<u>1047</u>	<u>1056</u>	<u>1405</u>	<u>1605</u>	<u>—</u>	<u>—</u>
Water Level	<u>41.02'</u>	<u>—</u>	<u>NA</u>	<u>41.05</u>	<u>—</u>	<u>—</u>
Well Volume Purged (gal.)	<u>0</u>	<u>8</u>	<u>NA</u>	<u>NA</u>	<u>—</u>	<u>—</u>
Turbidity	<u>st. turbid</u>	<u>clear</u>	<u>NA</u>	<u>opaque</u>	<u>—</u>	<u>—</u>
Odor	<u>none</u>	<u>none</u>	<u>NA</u>	<u>none</u>	<u>—</u>	<u>—</u>
Organic Vapor (ppm)	<u>—</u>	<u>—</u>	<u>NA</u>	<u>—</u>	<u>—</u>	<u>—</u>
pH (units)	<u>6.34</u>	<u>6.05</u>	<u>NA</u>	<u>7.37</u>	<u>—</u>	<u>—</u>
Conductivity ( $\mu$ mhos)	<u>502</u>	<u>482</u>	<u>NA</u>	<u>461</u>	<u>—</u>	<u>—</u>
Water Temperature (°C)	<u>64.1°</u>	<u>60.6</u>	<u>NA</u>	<u>63.2</u>	<u>—</u>	<u>—</u>
Notes: 1 ft. length of 4" = 0.087 ft <sup>3</sup> or 0.65 gal. 1 ft. length 2" = 0.022 ft <sup>3</sup> or 0.16 gal.						
Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91						

TETC184

\* NO<sub>3</sub><sup>2-</sup> sample collected @ 1405; remaining volumes  
~~to~~ collected @ 1605 except metals which were finally  
 collected (because of heavy silt load) at 1910.

# Resampling for BC-mw7

The Earth Technology Corporation

## GROUNDWATER SAMPLING

Sample ID: BC-mw7-GW4

PROJECT NAME 110th FG, MIANG JOB NO: 948901 DATE: 5/24/94  
 WELL NO. BC-mw7 LOCATION Base boundary  
 WEATHER CONDITIONS pty cloudy / light rain AMBIENT TEMP: 65-70  
 PERSONNEL JSB / CMF / Don Johnson  
 REVIEWED BY: Phlag 6/9/94

EQUIPMENT USED: Teflon bailer

### PURGING DEVICE

Type Device? Teflon bailer  
 How was the device decontaminated? see SOPs  
 How was the line decontaminated? N/A  
 Which well was previously purged? BC-mw15

### SAMPLING DEVICE

Type Device? Teflon bailer  
 How was the device decontaminated? see SOPs  
 How was the line decontaminated? N/A  
 Which well was previously sampled? BC-mw15

### INITIAL WELL VOLUME

Well diameter (in.) 2"  
 Stickup (ft.) ~ 2'  
 Depth to bottom of well (ft.) ~ 52.7'  
 Depth to water surface (ft.) 41.05' JSB  
 Length of water (ft.) 11.65'  
 Volume of water (ft<sup>3</sup>) 1.85 gallons  
 (gal.) x 4 = 7.5 purge  
 Amount of sediment at bottom of well (ft.) —  
 LNAPL (ft.) — DNAPL (ft.) —

### PURGING

Time started 1010 Finished 1035  
 Volume purged ~ 8 gallons  
 Comments on Well Recovery —  
 Additional Comments — Resampling  
 Samples Collected: Start 1050  
 Finish —

### IN-SITU TESTING

	Date: <u>5/24/94</u>	<u>5/24/94</u>	<u>5/24/94</u>				
Time:	<u>1010</u>	<u>1035</u>	<u>1050</u>				
Water Level	<u>41.05'</u>	<u>—</u>	<u>—</u>				
Well Volume Purged (gal.)	<u>0</u>	<u>8</u>	<u>—</u>				
Turbidity	<u>turbid</u>	<u>turbid</u>	<u>turbid</u>				
Odor	<u>no odor</u>	<u>no odor</u>	<u>no odor</u>				
Organic Vapor (ppm)	<u>—</u>	<u>—</u>	<u>—</u>				
pH (units)	<u>6.9</u>	<u>6.18</u>	<u>6.87</u>	<u>7.22</u>			
Conductivity ( $\mu$ mhos)	<u>598</u>	<u>513</u>	<u>491</u>	<u>502</u>			
Water Temperature (°C)	<u>56.9</u>	<u>57.9</u>	<u>55.8</u>	<u>58.2</u>			

Notes:

1 ft. length of 4"

Turbidity choices:

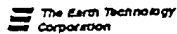
= 0.087 ft<sup>3</sup> or 0.65 gal.

clear, turbid, opaque

1 ft. length 2" = 0.022 ft<sup>3</sup> or 0.16 gal

Revision Date: 2-8-91

well was resampled  
5/24/94



# GROUNDWATER SAMPLING

Sample ID: BC-mw8-GW4

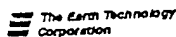
PROJECT NAME <u>110th EG, MINNG</u>		JOB NO: <u>948901</u>	DATE: <u>5/20/94</u>
WELL NO. <u>BC-mw8</u>	LOCATION <u>Battle Creek, Michigan</u>		
WEATHER CONDITIONS <u>clear</u>		AMBIENT TEMP: <u>75°</u>	
PERSONNEL <u>Mark Christenson / Jack Bruegel</u>			
REVIEWED BY: <u>PALag 6/9/94</u>			
EQUIPMENT USED: <u>Redi-Flo 2 pump, bailer</u>			
<b>PURGING DEVICE</b> Type Device? <u>Redi-Flo 2 pump</u> How was the device decontaminated? <u>see SOPs</u> How was the line decontaminated? <u>see SOPs</u> Which well was previously purged? <u>BL-MW7</u>		<b>SAMPLING DEVICE</b> Type Device? <u>Teflon bailer</u> How was the device decontaminated? <u>see SOPs</u> How was the line decontaminated? <u>N/A</u> Which well was previously sampled? <u>N/A</u>	
<b>INITIAL WELL VOLUME</b> Well diameter (in.) <u>2'</u> Stickup (ft.) <u>~ 2'</u> Depth to bottom of well (ft.) <u>~ 44'</u> Depth to water surface (ft.) <u>30.38</u> Length of water (ft.) <u>13.62'</u> Volume of water (ft <sup>3</sup> ) <u>2.2 gallons</u> (gal.) Amount of sediment at bottom of well (ft.) <u>—</u> LNAPL (ft.) <u>—</u> DNAPL (ft.) <u>—</u>		<b>PURGING</b> Time started <u>1219</u> Finished <u>1230</u> Volume purged <u>~ 9 gallons</u> Comments on Well Recovery <u>—</u> Additional Comments <u>slightly turbid at beginning of purge; cleaned up considerably</u> Samples Collected: Start <u>1415</u> Finish <u>1640</u>	
<b>IN-SITU TESTING</b>		Date: <u>5/20/94</u> <u>5/20/94</u> <u>5/20/94</u> <u>5/20/94</u>	
Time: <u>1219</u> <u>1230</u> <u>1415</u> <u>1640</u>			
Water Level <u>30.38</u> <u>—</u> <u>NA</u> <u>30.34</u>			
Well Volume Purged (gal.) <u>0</u> <u>9</u> <u>NA</u> <u>NA</u>			
Turbidity <u>slight</u> <u>clear</u> <u>NA</u> <u>turbid</u>			
Odor <u>none</u> <u>none</u> <u>NA</u> <u>none</u>			
Organic Vapor (ppm) <u>—</u> <u>—</u> <u>NA</u> <u>—</u>			
pH (units) <u>7.11</u> <u>7.47</u> <u>NA</u> <u>6.96</u>			
Conductivity (μ mhos) <u>522</u> <u>529</u> <u>NA</u> <u>501</u>			
Water Temperature (°C) <u>61.6</u> <u>64.6</u> <u>NA</u> <u>64.4</u>			
Notes: 1 ft. length of 4" = 0.087 ft <sup>3</sup> or 0.65 gal. 1 ft. length 2" = 0.022 ft <sup>3</sup> or 0.16 gal. Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91			

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\* Note: NO<sub>3</sub><sup>2-</sup> samples were collected @ 1415; remaining samples collected @ 1640



Resampling for BC-mw8



# GROUNDWATER SAMPLING

Sample ID: BC-mw8-GW4

PROJECT NAME 110th FG, MIANG JOB NO: 948901 DATE: 5/24/94  
 WELL NO. BC-mw8 LOCATION Base boundary wells  
 WEATHER CONDITIONS pty cloudy AMBIENT TEMP: 70°  
 PERSONNEL Don Johnson / CMF / JSB  
 REVIEWED BY: DA Lag 6/9/94

EQUIPMENT USED: Teflon bailer

## PURGING DEVICE

Type Device? Teflon bailer  
 How was the device decontaminated? see SOPs  
 How was the line decontaminated? NA  
 Which well was previously purged? BC-mw7

## SAMPLING DEVICE

Type Device? Teflon bailer  
 How was the device decontaminated? see SOPs  
 How was the line decontaminated? NA  
 Which well was previously sampled? BC-mw7

## INITIAL WELL VOLUME

Well diameter (in.) 2"  
 Stickup (ft.) ~ 2'  
 Depth to bottom of well (ft.) ~ 44  
 Depth to water surface (ft.) 30.42  
 Length of water (ft.) 13.58  
 Volume of water (ft<sup>3</sup>) 2.2 gallons  
 (gal.)  
 Amount of sediment at bottom of well (ft.) —  
 LNAPL (ft.) — DNAPL (ft.) —

## PURGING

Time started 1108 Finished 1120  
 Volume purged ~ 8 gallons  
 Comments on Well Recovery —  
 Additional Comments —  
 Samples Collected: Start 1130  
 Finish —

## IN-SITU TESTING

	Date: <u>5/24/94</u>	<u>5/24/94</u>	<u>5/24/94</u>				
Time:	<u>1108</u>	<u>1120</u>	<u>1130</u>				
Water Level	<u>30.42</u>	<u>—</u>	<u>30.82</u>				
Well Volume Purged (gal.)	<u>0</u>	<u>8</u>	<u>—</u>				
Turbidity	<u>clear/sl. turbid</u>	<u>turbid</u>	<u>turbid</u>				
Odor	<u>none</u>	<u>none</u>	<u>none</u>				
Organic Vapor (ppm)	<u>—</u>	<u>—</u>	<u>—</u>				
pH (units)	<u>7.75</u>	<u>7.83</u>	<u>8.06</u>				
Conductivity (μ mhos)	<u>548</u>	<u>549</u>	<u>546</u>				
Water Temperature (°C)	<u>56</u>	<u>56.3</u>	<u>61.2</u>				

Notes:

1 ft. length of 4"

= 0.087 ft<sup>3</sup> or 0.65 gal.

1 ft. length 2" = 0.022 ft<sup>3</sup> or 0.16 gal

Turbidity choices:

clear, turbid, opaque

Revision Date: 2-8-91

# GROUNDWATER SAMPLING

Sample ID: BC-mw9-GW4

PROJECT NAME 110th FG, MIANG JOB NO: 948901 DATE: 5/23/94  
 WELL NO. BC-mw9 LOCATION Base Boundary  
 WEATHER CONDITIONS clear/ptly cloudy AMBIENT TEMP: 80°  
 PERSONNEL CMF / JSB  
 REVIEWED BY: DHL 6/9/94

EQUIPMENT USED: Rediflo 2 pump / Teflon bailer

## PURGING DEVICE

Type Device? Rediflo 2 pump  
 How was the device decontaminated? see SOPs  
 How was the line decontaminated? see SOPs  
 Which well was previously purged? BC2-mw1

## SAMPLING DEVICE

Type Device? Teflon bailer  
 How was the device decontaminated? see SOPs  
 How was the line decontaminated? NA  
 Which well was previously sampled? BC2-mw1

## INITIAL WELL VOLUME

Well diameter (in.) 2"  
 Stickup (ft.) ~ 2'  
 Depth to bottom of well (ft.) 22'  
 Depth to water surface (ft.) 5.92'  
 Length of water (ft.) 16.08'  
 Volume of water (ft<sup>3</sup>) 2.56 x 4 =  
 (gal.) 10.24  
 Amount of sediment at bottom of well (ft.) —  
 LNAPL (ft.) — DNAPL (ft.) —

## PURGING

Time started 1533 Finished 1544  
 Volume purged ~ 10 gallons  
 Comments on Well Recovery —

Additional Comments water has a swampy, sulfur of methane odor

Samples Collected: Start 1600  
 JSB Finish 1615 for duplicate

IN-SITU TESTING	Date: <u>5/23/94</u>	<u>5/23/94</u>	<u>5/23/94</u>			
	Time: <u>1533</u>	<u>1544</u>	<u>1600</u>			
Water Level	<u>5.92'</u>	<u>—</u>	<u>6.05</u>			
Well Volume Purged (gal.)	<u>0</u>	<u>10</u>	<u>—</u>			
Turbidity	<u>turbid</u>	<u>clear</u>	<u>clear/sl. turbid</u>			
Odor	<u>no hydrocarbon odor</u>	<u>no hydrocarbon odor</u>	<u>no hydrocarbon odor</u>			
Organic Vapor (ppm)	<u>—</u>	<u>—</u>	<u>—</u>			
pH (units)	<u>6.87</u>	<u>6.82</u>	<u>6.96</u>			
Conductivity (µ mhos)	<u>395</u>	<u>459</u>	<u>464</u>			
Water Temperature (°C)	<u>66.3</u>	<u>57.2</u>	<u>66.3</u>			
	<u>JSB 5/23/94</u>					

Notes: 1 ft. length of 4" = 0.087 ft<sup>3</sup> or 0.65 gal. 1 ft. length 2" = 0.022 ft<sup>3</sup> or 0.16 gal.  
 Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91

Note: BC-mw18-GW4 field duplicate collected for this well also extra volume for MS/MSD

# GROUNDWATER SAMPLING

Sample ID: BC-MW11-GW4

PROJECT NAME 110 MFG, MANG JOB NO: 948901 DATE: 5/22/94  
 WELL NO. BC-MW11 LOCATION Base boundary  
 WEATHER CONDITIONS 75° clear AMBIENT TEMP: 75°  
 PERSONNEL CMF JJBuegel  
 REVIEWED BY: PHLag 6/9/94

EQUIPMENT USED: red. - flo 2 pump / Teflon bailer

## PURGING DEVICE

Type Device? red. - flo 2  
 How was the device decontaminated? see SOPs  
 How was the line decontaminated? see SOPs  
 Which well was previously purged? BC3-MW1

## SAMPLING DEVICE

Type Device? Teflon bailer  
 How was the device decontaminated? see SOPs  
 How was the line decontaminated? NA  
 Which well was previously sampled? NA

## INITIAL WELL VOLUME

Well diameter (in.) 2"  
 Stickup (ft.) ~ 2'  
 Depth to bottom of well (ft.) 30.04  
 Depth to water surface (ft.) 24.65  
 Length of water (ft.) 5.39'  
 Volume of water (ft<sup>3</sup>) —  
 (gal.) ~ 1 gallon  
 Amount of sediment at bottom of well (ft.) —  
 LNAPL (ft.) — DNAPL (ft.) —

## PURGING

Time started 0923 Finished 0930  
 Volume purged 5 gallons  
 Comments on Well Recovery NA  
 Additional Comments NA  
 Samples Collected: Start 1040  
 Finish —

## IN-SITU TESTING

	Date: <u>5/22/94</u>	<u>5/22/94</u>	<u>5/22/94</u>				
	Time: <u>0915</u>	<u>0930</u>	<u>1040</u>				
Water Level	<u>24.65</u>	<u>—</u>	<u>24.69</u>				
Well Volume Purged (gal.)	<u>0</u>	<u>5</u>	<u>—</u>				
Turbidity	<u>turbid</u>	<u>clear</u>	<u>sl. turbid</u>				
Odor	<u>none</u>	<u>none</u>	<u>none</u>				
Organic Vapor (ppm)	<u>—</u>	<u>—</u>	<u>—</u>				
pH (units)	<u>7.24</u>	<u>6.27</u>	<u>6.44</u>				
Conductivity (μ mhos)	<u>290</u>	<u>324</u>	<u>302</u>				
Water Temperature (°C)	<u>59.9</u>	<u>58.3</u>	<u>60.5</u>				

Notes:

1 ft. length of 4"

= 0.087 ft<sup>3</sup> or 0.65 gal.

1 ft. length 2" = 0.022 ft<sup>3</sup> or 0.16 gal

Turbidity choices:

clear, turbid, opaque

Revision Date: 2-8-91

# GROUNDWATER SAMPLING

Sample ID: BC-MW12-GW4

PROJECT NAME 110th FG MIANG JOB NO: 948901 DATE: 5/22/94  
 WELL NO. BC-MW12 LOCATION Base boundary  
 WEATHER CONDITIONS clear AMBIENT TEMP: 80°  
 PERSONNEL JSB / CMF  
 REVIEWED BY: PAL ag 6/9/94

EQUIPMENT USED: redi-flo 2 / bailer

PURGING DEVICE	SAMPLING DEVICE
Type Device? <u>Redi-flo 2 pump</u>	Type Device? <u>Teflon bailer</u>
How was the device decontaminated? <u>see SOPs</u>	How was the device decontaminated? <u>see SOPs</u>
How was the line decontaminated? <u>see SOPs</u>	How was the line decontaminated? <u>NA</u>
Which well was previously purged? <u>BC-MW11</u>	Which well was previously sampled? <u>BC-MW11</u>

INITIAL WELL VOLUME	PURGING
Well diameter (in.) <u>2"</u>	Time started <u>1033</u> Finished <u>1108</u>
Stickup (ft.) <u>~ 2'</u>	Volume purged <u>~ 40 gallons</u>
Depth to bottom of well (ft.) <u>84.70</u>	Comments on Well Recovery <u>—</u>
Depth to water surface (ft.) <u>24.80</u>	Additional Comments <u>—</u>
Length of water (ft.) <u>59.90</u>	
Volume of water (ft <sup>3</sup> ) <u>—</u>	
(gal.) <u>9.6 gallons</u>	
Amount of sediment at bottom of well (ft.) <u>—</u>	Samples Collected: Start <u>1130</u>
LNAPL (ft.) <u>—</u> DNAPL (ft.) <u>—</u>	Finish <u>1145</u>

IN-SITU TESTING	Date: <u>5/22/94</u>	<u>5/22</u>	<u>5/22</u>	<u>5/22</u>			
	Time: <u>1033</u>	<u>1052</u>	<u>1108</u>	<u>1130</u>			
Water Level	<u>24.80</u>	<u>—</u>	<u>—</u>	<u>24.95</u>			
Well Volume Purged (gal.)	<u>0</u>	<u>20</u>	<u>40</u>	<u>—</u>			
Turbidity	<u>clear</u>	<u>—</u>	<u>clear</u>	<u>clear</u>			
Odor	<u>none</u>	<u>—</u>	<u>none</u>	<u>none</u>			
Organic Vapor (ppm)	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>			
pH (units)	<u>6.44</u>	<u>6.4</u>	<u>6.52</u>	<u>—</u>			
Conductivity (μ mhos)	<u>302</u>	<u>551</u>	<u>582</u>	<u>—</u>			
Water Temperature (°C)	<u>60.5</u>	<u>58.8</u>	<u>60.9</u>	<u>—</u>			

Notes: 1 ft. length of 4" = 0.087 ft<sup>3</sup> or 0.65 gal. 1 ft. length 2" = 0.022 ft<sup>3</sup> or 0.16 gal.  
 Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91

# GROUNDWATER SAMPLING

Sample ID: BC-mw13-bw4

PROJECT NAME 110th FG, MIANG JOB NO: 948901 DATE: 5/19/94  
 WELL NO. BC-mw13 LOCATION Base boundary  
 WEATHER CONDITIONS warm, 70° AMBIENT TEMP: clear  
 PERSONNEL J. Bonegel / CM Inge  
 REVIEWED BY: PHC ag 6/9/94

EQUIPMENT USED: Rediflo 2 pump / teflon bailer

## PURGING DEVICE

Type Device? Rediflo 2 pump  
 How was the device decontaminated? See SOPs  
 How was the line decontaminated? See SOPs  
 Which well was previously purged? none

## SAMPLING DEVICE

Type Device? Teflon bailer  
 How was the device decontaminated? see SOPs  
 How was the line decontaminated? new line  
 Which well was previously sampled? BC-mw1

## INITIAL WELL VOLUME

Well diameter (in.) 2"  
 Stickup (ft.) ~2'  
 Depth to bottom of well (ft.) ~96.7'  
 Depth to water surface (ft.) 37.46' BTOL  
 Length of water (ft.) 61.23'  
 Volume of water (ft<sup>3</sup>) 9.72 gallons  
 (gal.)  
 Amount of sediment at bottom of well (ft.) —  
 LNAPL (ft.) — DNAPL (ft.) —

## PURGING

Time started 1648 Finished 1744  
 Volume purged 40 gallons  
 Comments on Well Recovery NA  
 Additional Comments note: large conductivity difference once well was purged ~ 20 gallons  
 Samples Collected: Start 0815 Finish 0935

## IN-SITU TESTING

	Date: <u>5/19/94</u>	<u>5/19/94</u>	<u>5/19/94</u>	<u>5-20</u>			
Time:				<u>0810</u>			
Water Level	<u>37.46'</u>	<u>NA</u>	<u>NA</u>	<u>37.5</u>			
Well Volume Purged (gal.)	<u>0</u>	<u>20</u>	<u>40</u>	<u>—</u>			
Turbidity	<u>clear</u>	<u>clear</u>	<u>clear</u>	<u>clear</u>			
Odor	<u>none</u>	<u>none</u>	<u>none</u>	<u>none</u>			
Organic Vapor (ppm)	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>			
pH (units)	<u>7.82</u>	<u>7.09</u>	<u>7.28</u>	<u>7.72</u>			
Conductivity (μ mhos)	<u>467</u>	<u>716</u>	<u>753</u>	<u>782</u>			
Water Temperature (°C)	<u>64.6°F</u>	<u>60.3°F</u>	<u>60.4°F</u>	<u>56.3</u>			

Notes: 1 ft. length of 4" = 0.087 ft<sup>3</sup> or 0.65 gal. 1 ft. length 2" = 0.022 ft<sup>3</sup> or 0.16 gal.  
 Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91

# GROUNDWATER SAMPLING

Sample ID: BC-MW14-GW4

PROJECT NAME 110M FG, M1ANG JOB NO: 948901 DATE: 5/22/94  
 WELL NO. BC-MW14 LOCATION base boundary  
 WEATHER CONDITIONS clear AMBIENT TEMP: 90°  
 PERSONNEL CMF/JSB  
 REVIEWED BY: PA Lag 6/9/94

EQUIPMENT USED: Teflon bailer / medi-flo 2 pump

## PURGING DEVICE

Type Device? medi-flo 2 pump  
 How was the device decontaminated? see SOPs  
 How was the line decontaminated? see SOPs  
 Which well was previously purged? BC-MW6

## SAMPLING DEVICE

Type Device? Teflon bailer  
 How was the device decontaminated? see SOPs  
 How was the line decontaminated? NA  
 Which well was previously sampled? BC-MW6

## INITIAL WELL VOLUME

Well diameter (in.) 2"  
 Stickup (ft.) ~2'  
 Depth to bottom of well (ft.) ~89.6  
 Depth to water surface (ft.) 31.70  
 Length of water (ft.) 57.9  
 Volume of water (ft<sup>3</sup>) —  
 (gal.) ~9 gallons  
 Amount of sediment at bottom of well (ft.) —  
 LNAPL (ft.) — DNAPL (ft.) —

## PURGING

Time started 1530 Finished 1602  
 Volume purged ~36 gallons  
 Comments on Well Recovery —  
 Additional Comments —  
 Sample Collected: Start 1610  
 Finish 1650

## IN-SITU TESTING

	Date: <u>5/22/94</u>	<u>5/22/94</u>	<u>5/22/94</u>	<u>5/22/94</u>			
Time:	<u>1530</u>	<u>1546</u>	<u>1602</u>	<u>1610</u>			
Water Level	<u>31.70</u>	<u>—</u>	<u>—</u>	<u>32.07</u>			
Well Volume Purged (gal.)	<u>0</u>	<u>~18</u>	<u>36</u>	<u>—</u>			
Turbidity	<u>clear</u>	<u>sl. turbid</u>	<u>sl. turbid</u>	<u>—</u>			
Odor	<u>none</u>	<u>faint</u>	<u>faint</u>	<u>—</u>			
Organic Vapor (ppm)	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>			
pH (units)	<u>6.83</u>	<u>6.93</u>	<u>6.93</u>	<u>6.83</u>			
Conductivity (μ mhos)	<u>532</u>	<u>564</u>	<u>564</u>	<u>525</u>			
Water Temperature (°C)	<u>70.3</u>	<u>64.5</u>	<u>64.5</u>	<u>71.7</u>			

Notes: 1 ft. length of 4" = 0.087 ft<sup>3</sup> or 0.65 gal. 1 ft. length 2" = 0.022 ft<sup>3</sup> or 0.16 gal.  
 Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91

6.8  
559  
64.2

Well was resampled  
5/24/94



# GROUNDWATER SAMPLING

Sample ID: BC-mw15-GW4

PROJECT NAME 110th FG, MIANG JOB NO: 948901 DATE: 5/20/94  
 WELL NO. BC-MW15 LOCATION Battle Creek, Michigan  
 WEATHER CONDITIONS clear AMBIENT TEMP: 70-75°  
 PERSONNEL Mark Christenson / Jack Briegel  
 REVIEWED BY: PHLag 6/9/94

EQUIPMENT USED: Redi - Flo 2 pump / bailer

## PURGING DEVICE

Type Device? Redi - Flo 2 pump  
 How was the device decontaminated? see SOPs  
 How was the line decontaminated? see SOPs  
 Which well was previously purged? BC-MW3

## SAMPLING DEVICE

Type Device? Teflon bailer  
 How was the device decontaminated? see SOPs  
 How was the line decontaminated? N/A  
 Which well was previously sampled? N/A

## INITIAL WELL VOLUME

Well diameter (in.) 2'  
 Stickup (ft.) ~ 2'  
 Depth to bottom of well (ft.) ~ 81.45'  
 Depth to water surface (ft.) 40.04' JSE  
 Length of water (ft.) 41.41' 5/20/94  
 Volume of water (ft<sup>3</sup>) -  
 (gal.) 6.7  
 Amount of sediment at bottom of well (ft.) -  
 LNAPL (ft.) - DNAPL (ft.) -

## PURGING

Time started 0915 Finished 0940  
 Volume purged ~ 30 gallons  
 Comments on Well Recovery -

Additional Comments forgot pH, cond meter  
collected sample for measurement  
@ decon area (1025 am)

Samples Collected: Start 1545  
 Finish N/A

## IN-SITU TESTING

	Date: <u>5/20/94</u>	<u>5/20/94</u>	<u>5/21/94</u> <sup>ⓧ</sup>				
	Time: <u>1545</u>	<u>1043</u>					
Water Level	<u>41.41</u>	<u>42.01</u>	<u>42.05</u>				
Well Volume Purged (gal.)	<u>0</u>	<u>-</u>	<u>6.6</u>				
Turbidity	<u>clear</u>	<u>clear</u>	<u>-</u>				
Odor	<u>none</u>	<u>none</u>	<u>-</u>				
Organic Vapor (ppm)	<u>-</u>	<u>-</u>	<u>-</u>				
pH (units)	<u>7.63</u>	<u>7.51</u>	<u>8.19</u>				
Conductivity (μ mhos)	<u>782</u>	<u>468</u>	<u>419</u>				
Water Temperature (°C)	<u>14.3</u>	<u>66.9</u>	<u>66.8</u>				

Notes:

1 ft. length of 4"

= 0.087 ft<sup>3</sup> or 0.65 gal.

1 ft. length 2" = 0.022 ft<sup>3</sup> or 0.16 gal

Turbidity choices:

clear, turbid, opaque

Revision Date: 2-8-91

TETC154

\* NO<sub>3</sub><sup>2-</sup> sample collected @ 1400 hours; remaining  
 samples collected @ 1545; <sup>ⓧ</sup>SVOCs resampled 1043 (5/21/94);

Resampling for BC-MW15

The Earth Technology Corporation

# GROUNDWATER SAMPLING

Sample ID: BC-MW15-GW4

PROJECT NAME <u>110th FG, MIANG</u>		JOB NO: <u>948901</u>	DATE: <u>5/24/94</u>																																																																																
WELL NO. <u>BC-MW15</u>		LOCATION <u>Base boundary wells</u>																																																																																	
WEATHER CONDITIONS <u>ptly cloudy / lt. rain</u>		AMBIENT TEMP: <u>65°-70°</u>																																																																																	
PERSONNEL <u>Don Johnson / JSB / CMF</u>																																																																																			
REVIEWED BY: <u>6/9/94</u>																																																																																			
EQUIPMENT USED: <u>rediflo 2 / Teflon bailer</u>																																																																																			
<b>PURGING DEVICE</b> Type Device? <u>rediflo 2 pump</u> How was the device decontaminated? <u>see SOPs</u> How was the line decontaminated? <u>See SOPs</u> Which well was previously purged? <u>BC3-MW2</u>		<b>SAMPLING DEVICE</b> Type Device? <u>Teflon bailer</u> How was the device decontaminated? <u>see SOPs</u> How was the line decontaminated? <u>N/A</u> Which well was previously sampled? <u>BC3-MW2</u>																																																																																	
<b>INITIAL WELL VOLUME</b> Well diameter (in.) <u>2"</u> Stickup (ft.) <u>~ 2'</u> Depth to bottom of well (ft.) <u>~ 81.45'</u> Depth to water surface (ft.) <u>42.00</u> Length of water (ft.) <u>39.55'</u> Volume of water (ft <sup>3</sup> ) <u>6.2</u> (gal.) Amount of sediment at bottom of well (ft.) <u>—</u> LNAPL (ft.) <u>—</u> DNAPL (ft.) <u>—</u>		<b>PURGING</b> Time started <u>0950</u> Finished <u>1014</u> Volume purged <u>~ 30 gallons</u> Comments on Well Recovery _____ Additional Comments <u>Resampling</u> Samples Collected: Start <u>1040</u> Finish _____																																																																																	
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>IN-SITU TESTING</th> <th>Date: <u>5/24/94</u></th> <th><u>5/24/94</u></th> <th><u>5/24/94</u></th> <th>_____</th> <th>_____</th> <th>_____</th> <th>_____</th> </tr> </thead> <tbody> <tr> <td>Time:</td> <td><u>0950</u></td> <td><u>1014</u></td> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>Water Level</td> <td><u>42.00</u></td> <td><u>—</u></td> <td><u>42.6'</u></td> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>Well Volume Purged (gal.)</td> <td><u>0</u></td> <td><u>~30</u></td> <td><u>—</u></td> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>Turbidity</td> <td><u>clear</u></td> <td><u>turbid</u></td> <td><u>clear</u></td> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>Odor</td> <td><u>none</u></td> <td><u>none</u></td> <td><u>none</u></td> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>Organic Vapor (ppm)</td> <td><u>—</u></td> <td><u>—</u></td> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>pH (units)</td> <td><u>6.18</u></td> <td><u>7.56</u></td> <td><u>6.88</u></td> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>Conductivity (µ mhos)</td> <td><u>513</u></td> <td><u>523</u></td> <td><u>500</u></td> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>Water Temperature (°C)</td> <td><u>57.9</u></td> <td><u>56.3</u></td> <td><u>56.5</u></td> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> </tbody> </table>				IN-SITU TESTING	Date: <u>5/24/94</u>	<u>5/24/94</u>	<u>5/24/94</u>	_____	_____	_____	_____	Time:	<u>0950</u>	<u>1014</u>	_____	_____	_____	_____	_____	Water Level	<u>42.00</u>	<u>—</u>	<u>42.6'</u>	_____	_____	_____	_____	Well Volume Purged (gal.)	<u>0</u>	<u>~30</u>	<u>—</u>	_____	_____	_____	_____	Turbidity	<u>clear</u>	<u>turbid</u>	<u>clear</u>	_____	_____	_____	_____	Odor	<u>none</u>	<u>none</u>	<u>none</u>	_____	_____	_____	_____	Organic Vapor (ppm)	<u>—</u>	<u>—</u>	_____	_____	_____	_____	_____	pH (units)	<u>6.18</u>	<u>7.56</u>	<u>6.88</u>	_____	_____	_____	_____	Conductivity (µ mhos)	<u>513</u>	<u>523</u>	<u>500</u>	_____	_____	_____	_____	Water Temperature (°C)	<u>57.9</u>	<u>56.3</u>	<u>56.5</u>	_____	_____	_____	_____
IN-SITU TESTING	Date: <u>5/24/94</u>	<u>5/24/94</u>	<u>5/24/94</u>	_____	_____	_____	_____																																																																												
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Notes: 1 ft. length of 4" = 0.087 ft <sup>3</sup> or 0.65 gal. 1 ft. length 2" = 0.022 ft <sup>3</sup> or 0.18 gal Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91																																																																																			



# GROUNDWATER SAMPLING

Sample ID: BC2-MW1-6-W4

PROJECT NAME 110<sup>th</sup> FG MIANG JOB NO: 948901 DATE: 5/23/94  
 WELL NO. BC2-MW1 LOCATION Site 2: Drainage Swale  
 WEATHER CONDITIONS clear/ptly cloudy AMBIENT TEMP: 70°  
 PERSONNEL Carol Frye / Jack Briegel  
 REVIEWED BY: PH Lag 6/9/94

EQUIPMENT USED: pump/bailer

## PURGING DEVICE

Type Device? red-flo 2 pump  
 How was the device decontaminated? see SOPs  
 How was the line decontaminated? N/A  
 Which well was previously purged? BC-MWS

## SAMPLING DEVICE

Type Device? Teflon bailer  
 How was the device decontaminated? see SOPs  
 How was the line decontaminated? N/A  
 Which well was previously sampled? \_\_\_\_\_

## INITIAL WELL VOLUME

Well diameter (in.) 2"  
 Stickup (ft.) ~ 2'  
 Depth to bottom of well (ft.) 38'  
 Depth to water surface (ft.) 25.02'  
 Length of water (ft.) 12.98'  
 Volume of water (ft<sup>3</sup>) \_\_\_\_\_  
 (gal.) 2.07 gallons  
 Amount of sediment at bottom of well (ft.) \_\_\_\_\_  
 LNAPL (ft.) \_\_\_\_\_ DNAPL (ft.) \_\_\_\_\_

## PURGING

Time started 1105 Finished 1117  
 Volume purged 8 gallons  
 Comments on Well Recovery \_\_\_\_\_  
 Additional Comments \_\_\_\_\_  
 Samples Collected: Start 1130  
 Finish \_\_\_\_\_

## IN-SITU TESTING

	Date: <u>5/23</u>	Date: <u>5/23</u>	Date: <u>5/23</u>				
Time:	<u>1106</u>	<u>1117</u>	<u>1130</u>				
Water Level	<u>25.02</u>	<u>—</u>	<u>26.00</u>				
Well Volume Purged (gal.)	<u>0</u>	<u>8</u>	<u>—</u>				
Turbidity	<u>turbid</u>	<u>clear</u>	<u>clear</u>				
Odor	<u>none</u>	<u>faint</u>	<u>faint</u>				
Organic Vapor (ppm)	<u>—</u>	<u>—</u>	<u>—</u>				
pH (units)	<u>6.62</u>	<u>6.85</u>	<u>8.12</u>				
Conductivity (µ mhos)	<u>523</u>	<u>545</u>	<u>602</u>				
Water Temperature (°C)	<u>71.7</u>	<u>60.7</u>	<u>69.4°</u>				

## Notes:

1 ft. length of 4"

= 0.087 ft<sup>3</sup> or 0.65 gal.

1 ft. length 2" = 0.022 ft<sup>3</sup> or 0.16 gal

Turbidity choices:

clear, turbid, opaque

Revision Date: 2-8-91

# GROUNDWATER SAMPLING

Sample ID: BC3-MW1-GW4

PROJECT NAME 110<sup>th</sup> Fg MIANG JOB NO: 948901 DATE: 5/21/94  
 WELL NO. BC3-MW1 LOCATION Site 3; Battle Creek Michigan  
 WEATHER CONDITIONS clear AMBIENT TEMP: 75°  
 PERSONNEL CMF/mc/JSB  
 REVIEWED BY: PHL/eng 6/9/94

EQUIPMENT USED: Redi Flo 2 pump / Teflon Bailers

## PURGING DEVICE

Type Device? Redi Flo 2 pump  
 How was the device decontaminated? see SOPs  
 How was the line decontaminated? see SOPs  
 Which well was previously purged?                     

## SAMPLING DEVICE

Type Device? Teflon bailer  
 How was the device decontaminated? see SOPs  
 How was the line decontaminated? NA  
 Which well was previously sampled? NA

## INITIAL WELL VOLUME

Well diameter (in.) 2"  
~ 2'  
 Stickup (ft.)                       
 Depth to bottom of well (ft.) 41.6  
 Depth to water surface (ft.) 30.87  
 Length of water (ft.) 10.73  
 Volume of water (ft<sup>3</sup>)                       
 (gal.) 1.71 gallons  
 Amount of sediment at bottom of well (ft.)                       
 LNAPL (ft.)                      DNAPL (ft.)                     

## PURGING

5/21/94  
 Time started 1740 Finished 1750  
 Volume purged ~ 7 gallons  
 Comments on Well Recovery                       
 Additional Comments                       
 Samples Collected: Start 0740  
 Finish 0840

## IN-SITU TESTING

Date:	5-91	5/24	5/22				
Time:	1742	1750	0740				
Water Level	30.87	-	30.88				
Well Volume Purged (gal.)	0	7	-				
Turbidity	opaque	sl. turbid	turbid				
Odor	none	none	none				
Organic Vapor (ppm)	-	-	-				
pH (units)	6.98	6.72	6.78				
Conductivity (μ mhos)	537	456	503				
Water Temperature (°C)	25.6	65.2	62.3				

Notes:

1 ft. length of 4"

= 0.037 ft<sup>3</sup> or 0.65 gal.

1 ft. length 2" = 0.022 ft<sup>3</sup> or 0.16 gal

Turbidity choices:

clear, turbid, opaque

Revision Date: 2-8-91

JSB  
 dup (BC3-MW17-GW4) and MS/MSD collected here

# GROUNDWATER SAMPLING

Sample ID: BC3-MW2-GW4

PROJECT NAME 110th FG MIANG JOB NO: 948901 DATE: 5/21/94  
 WELL NO. BC3-MW2 LOCATION Site 3: Battle Creek, Michigan  
 WEATHER CONDITIONS clear AMBIENT TEMP: 75°  
 PERSONNEL MC/JSB/CMF  
 REVIEWED BY: PHLag 6/9/93

EQUIPMENT USED: Redi Flo 2 pump / bailer

## PURGING DEVICE

Type Device? Redi Flo 2 pump  
 How was the device decontaminated? see SOPs  
 How was the line decontaminated? see SOPs  
 Which well was previously purged? \_\_\_\_\_

## SAMPLING DEVICE

Type Device? Teflon bailer  
 How was the device decontaminated? see SOPs  
 How was the line decontaminated? NA  
 Which well was previously sampled? NA

## INITIAL WELL VOLUME

Well diameter (in.) = 2"  
 Stickup (ft.) = 2'  
 Depth to bottom of well (ft.) 40.5'  
 Depth to water surface (ft.) 29.04'  
 Length of water (ft.) JSB 6/2/94 40.5' 11.46'  
 Volume of water (ft<sup>3</sup>) 1.83 x 4 = 7.5 gallons  
 (gal.) \_\_\_\_\_  
 Amount of sediment at bottom of well (ft.) —  
 LNAPL (ft.) — DNAPL (ft.) —

## PURGING

Time started 1730 Finished 1742  
 Volume purged ~ 10 gallons  
 Comments on Well Recovery —  
 Additional Comments —  
 Samples Collected: Start 1755  
 Finish \_\_\_\_\_

## IN-SITU TESTING

	Date: <u>5/23/94</u>	<u>5/23/94</u>	<u>5/23/94</u>				
Time:	<u>1730</u>	<u>1742</u>	<u>1755</u>				
Water Level	<u>29.04</u>	<u>—</u>	<u>29.08</u>				
Well Volume Purged (gal.)	<u>0</u>	<u>10</u>	<u>—</u>				
Turbidity	<u>turbid</u>	<u>clear</u>	<u>sl. turbid</u>				
Odor	<u>none</u>	<u>moderate</u>	<u>strong</u>				
Organic Vapor (ppm)	<u>—</u>	<u>—</u>	<u>—</u>				
pH (units)	<u>7.09</u>	<u>6.70</u>	<u>6.82</u>				
Conductivity (μ mhos)	<u>459</u>	<u>554</u>	<u>527</u>				
Water Temperature (°C)	<u>70.12</u>	<u>66.4</u>	<u>66.7</u>				

Notes:

1 ft. length of 4"

= 0.087 ft<sup>3</sup> or 0.65 gal.

1 ft. length 2" = 0.022 ft<sup>3</sup> or 0.16 gal

Turbidity choices:

clear, turbid, opaque

Revision Date: 2-8-91

\* checked with oil-water interface probe

# GROUNDWATER SAMPLING

Sample ID: BC3-MW3-GW4

PROJECT NAME 110th FG - MIANG JOB NO: 948901 DATE: 5/21/94  
 WELL NO. BC3-MW3 LOCATION Site 3; Battle Creek Michigan  
 WEATHER CONDITIONS clear AMBIENT TEMP: 75°  
 PERSONNEL MC/JSD/CMF  
 REVIEWED BY: DHLag 6/9/94

EQUIPMENT USED: Redi Flo 2 / bailer

PURGING DEVICE	SAMPLING DEVICE
Type Device? <u>Redi Flo 2</u>	Type Device? <u>Teflon bailer</u>
How was the device decontaminated? <u>see SOPs</u>	How was the device decontaminated? <u>see SOPs</u>
How was the line decontaminated? <u>see SOPs</u>	How was the line decontaminated? <u>NA</u>
Which well was previously purged? <u></u>	Which well was previously sampled? <u>NA</u>

INITIAL WELL VOLUME	PURGING
Well diameter (in.) <u>2"</u>	Time started <u>10:10 AM</u> Finished <u>12:15</u>
Stickup (ft.) <u>~2'</u>	Volume purged <u>8 gal</u>
Depth to bottom of well (ft.) <u>39.13'</u>	Comments on Well Recovery <u>-</u>
Depth to water surface (ft.) <u>28.58</u>	Additional Comments <u>-</u>
Length of water (ft.) <u>10.55</u>	
Volume of water (ft <sup>3</sup> ) <u>1.725</u>	
(gal.) <u>1.725 gal</u>	
Amount of sediment at bottom of well (ft.) <u>purge 2 x 4 = 8 gal</u>	Sample Collected: Start <u>1418</u> <u>1655</u>
LNAPL (ft.) <u></u> DNAPL (ft.) <u></u>	Finish <u>1445</u> <u>5/21/94</u>

IN-SITU TESTING	Date: <u>5-21</u>	<u>5-2</u>	<u>5-21-94</u>	<u>5/21/94</u>			
	Time: <u>12:15</u>	<u>12:15</u>	<u>1445</u>	<u>1655</u>			
Water Level	<u>28.58</u>	<u>-</u>	<u>29.45</u>	<u>28.63</u>			
Well Volume Purged (gal.)	<u>80</u>	<u>-8</u>	<u>-</u>	<u>-</u>			
Turbidity	<u>clear</u>	<u>clear</u>	<u>clear</u>	<u>sl. turbid</u>			
Odor	<u>none</u>	<u>none</u>	<u>none</u>	<u>none</u>			
Organic Vapor (ppm)	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>			
pH (units)	<u>7.67</u>	<u>7.50</u>	<u>7.75</u>	<u>7.75</u>			
Conductivity (μ mhos)	<u>740</u>	<u>410</u>	<u>367</u>	<u>367</u>			
Water Temperature (°C)	<u>22.5</u>	<u>65.4</u>	<u>68.5</u>	<u>66.5</u>			

Notes: 1 ft. length of 4" = 0.087 ft<sup>3</sup> or 0.65 gal. 1 ft. length 2" = 0.022 ft<sup>3</sup> or 0.16 gal.  
 Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91

# GROUNDWATER SAMPLING

Sample ID: BC3-MW4-GW4

PROJECT NAME 110th Fg, MIANG JOB NO: 948901 DATE: 5/21/94  
 WELL NO. BC3-MW4 LOCATION Site 3: Battle Creek Michigan  
 WEATHER CONDITIONS clear AMBIENT TEMP: 75°  
 PERSONNEL MC/JSB/CMF  
 REVIEWED BY: PA Lay 6/9/94  
 EQUIPMENT USED: Rediflo 2 pump / bailer

PURGING DEVICE	SAMPLING DEVICE
Type Device? <u>Rediflo 2 pump</u>	Type Device? <u>Teflon bailer</u>
How was the device decontaminated? <u>see SOPs</u>	How was the device decontaminated? <u>see SOPs</u>
How was the line decontaminated? <u>see SOPs</u>	How was the line decontaminated? <u>NA</u>
Which well was previously purged?	Which well was previously sampled? <u>NA</u>

INITIAL WELL VOLUME	PURGING
Well diameter (in.) <u>2"</u>	Time started <u>1125</u> Finished <u>1140</u>
Stickup (ft.) <u>~2'</u>	Volume purged <u>~17 gallons</u>
Depth to bottom of well (ft.) <u>67.3'</u>	Comments on Well Recovery
Depth to water surface (ft.) <u>29.32'</u>	Additional Comments
Length of water (ft.) <u>37.98'</u>	
Volume of water (ft <sup>3</sup> ) <u>5</u>	
(gal.) <u>5.95</u>	
Amount of sediment at bottom of well (ft.) <u>purge 6 x 3 = 18</u>	Samples Collected: Start <u>1418</u>
LNAPL (ft.) <u>-</u> DNAPL (ft.) <u>-</u>	Finish

IN-SITU TESTING	Date: <u>5-21</u>	<u>5-21</u>	<u>5-21-94</u>				
	Time: <u>1125</u>	<u>1140</u>	<u>1418</u>				
Water Level	<u>29.32</u>	<u>-</u>	<u>29.45</u>				
Well Volume Purged (gal.)	<u>17</u>	<u>17</u>	<u>-</u>				
Turbidity	<u>clear</u>	<u>clear</u>	<u>clear</u>				
Odor	<u>none</u>	<u>none</u>	<u>none</u>				
Organic Vapor (ppm)	<u>-</u>	<u>-</u>	<u>-</u>				
pH (units)	<u>8.19</u>	<u>7.88</u>	<u>-</u>				
Conductivity (μ mhos)	<u>438</u>	<u>510</u>	<u>-</u>				
Water Temperature (°F)	<u>64.8</u>	<u>68.9</u>	<u>64.5</u>				

Notes: 1 ft. length of 4" = 0.087 ft<sup>3</sup> or 0.65 gal. 1 ft. length 2" = 0.022 ft<sup>3</sup> or 0.16 gal.  
 Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91

# GROUNDWATER SAMPLING

Sample ID: BC3-MW5-GW4

PROJECT NAME 110 m FG, MIANG JOB NO: 948901 DATE: 5/20/94  
 WELL NO. BC3-MW5 LOCATION Site 3; Battle Creek, Michigan  
 WEATHER CONDITIONS clear AMBIENT TEMP: 70°  
 PERSONNEL Carol Frye / Mark Christenson / JSB  
 REVIEWED BY: PH Lay 6/9/94

EQUIPMENT USED: Rediflo 2 pump / bailer

## PURGING DEVICE

Type Device? Rediflo 2 pump  
 How was the device decontaminated? see SOPs  
 How was the line decontaminated? see SOPs  
 Which well was previously purged? BC-MW8

## SAMPLING DEVICE

Type Device? Teflon bailer  
 How was the device decontaminated? see SOPs  
 How was the line decontaminated? NA  
 Which well was previously sampled? NA

## INITIAL WELL VOLUME

Well diameter (in.) 2'  
 Stickup (ft.) ~ 2'  
 Depth to bottom of well (ft.) 42.0'  
 Depth to water surface (ft.) 29.59  
 Length of water (ft.) 12.41  
 Volume of water (ft<sup>3</sup>) —  
 (gal.) 1.98 gallons  
 Amount of sediment at bottom of well (ft.) —  
 LNAPL (ft.) — DNAPL (ft.) —

## PURGING

Time started 1743 Finished 1752  
 Volume purged ~ 8 gallons  
 Comments on Well Recovery —  
 Additional Comments —  
 Samples Collected: Start 0740  
 Finish 0915

## IN-SITU TESTING

	Date: <u>5/20/94</u>	Date: <u>5/20/94</u>	Date: <u>5/21/94</u>				
Time:	<u>1743</u>	<u>1752</u>	<u>0740</u>				
Water Level	<u>29.59</u>	<u>—</u>	<u>29.55</u>				
Well Volume Purged (gal.)	<u>0</u>	<u>8</u>	<u>—</u>				
Turbidity	<u>sl. turbid</u>	<u>clear</u>	<u>—</u>				
Odor	<u>none</u>	<u>none</u>	<u>—</u>				
Organic Vapor (ppm)	<u>—</u>	<u>—</u>	<u>—</u>				
pH (units)	<u>6.6</u>	<u>6.54</u>	<u>7.85</u>				
Conductivity (μ mhos)	<u>573</u>	<u>409</u>	<u>437</u>				
Water Temperature (°C)	<u>75.5</u>	<u>62.9</u>	<u>60.5°</u>				

Notes: 1 ft. length of 4" = 0.087 ft<sup>3</sup> or 0.65 gal. 1 ft. length 2" = 0.022 ft<sup>3</sup> or 0.16 gal.  
 Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91

# GROUNDWATER SAMPLING

Sample ID: BC3-MW 6-6W4

PROJECT NAME 110th FG MIANG JOB NO: 948901 DATE: 5/20/94  
 WELL NO. BC3-MW 6 LOCATION Site 3; Battle Creek, Mich  
 WEATHER CONDITIONS Clear AMBIENT TEMP: 70°  
 PERSONNEL Carol Frye / MC / JSB  
 REVIEWED BY: PHLag 6/9/94

EQUIPMENT USED: Teflon bailer / Rodi Flo 2 pump

## PURGING DEVICE

Type Device? Rodi Flo 2 pump  
 How was the device decontaminated? see SOPs  
 How was the line decontaminated? see SOPs  
 Which well was previously purged? BC3-MW 5

## SAMPLING DEVICE

Type Device? Teflon bailer  
 How was the device decontaminated? see SOPs  
 How was the line decontaminated? NA  
 Which well was previously sampled? NA

## INITIAL WELL VOLUME

Well diameter (in.) 2"  
 Stickup (ft.) ~2'  
 Depth to bottom of well (ft.) 35'  
 Depth to water surface (ft.) 23.79  
 Length of water (ft.) 11.21'  
 Volume of water (ft<sup>3</sup>) —  
 (gal.) 1.78 gallons  
 Amount of sediment at bottom of well (ft.) —  
 LNAPL (ft.) — DNAPL (ft.) —

## PURGING

Time started 1835 Finished —  
 Volume purged 7 gallons  
 Comments on Well Recovery —  
 Additional Comments —  
 Samples Collected: Start 0750  
 Finish —

## IN-SITU TESTING

	Date: <u>5/20/94</u>	<u>5/20/94</u>	<u>5/21/94</u>				
Time:	<u>1835</u>	<u>—</u>	<u>0750</u>				
Water Level	<u>23.79</u>	<u>—</u>	<u>23.81</u>				
Well Volume Purged (gal.)	<u>0</u>	<u>7</u>	<u>—</u>				
Turbidity	<u>turbid</u>	<u>clear/sl. turbid</u>	<u>—</u>				
Odor	<u>none</u>	<u>none</u>	<u>—</u>				
Organic Vapor (ppm)	<u>—</u>	<u>—</u>	<u>—</u>				
pH (units)	<u>6.65</u>	<u>6.89</u>	<u>7.64</u>				
Conductivity (μ mhos)	<u>466</u>	<u>432</u>	<u>450</u>				
Water Temperature (°C)	<u>67.6</u>	<u>60.2</u>	<u>59.6</u>				

## Notes:

1 ft. length of 4"

= 0.087 ft<sup>3</sup> or 0.65 gal.

1 ft. length 2" = 0.022 ft<sup>3</sup> or 0.16 gal

Turbidity choices:

clear, turbid, opaque

Revision Date: 2-8-91

# GROUNDWATER SAMPLING

Sample ID: BCI-mw2-GW6

PROJECT NAME 110<sup>th</sup> FG MICHIGAN ANG JOB NO: 948901 DATE: 5/17/95  
 WELL NO. 1MW2 RI LOCATION Site 1: Fuel Tank Farm  
 WEATHER CONDITIONS cloudy, warm AMBIENT TEMP: 65°  
 PERSONNEL JSB (EarthTech), Jim Madaj (HAZWAP)  
 REVIEWED BY: JSB

EQUIPMENT USED: disposable polyethylene bailer, disposable Teflon bailer  
HYDAC #9305 HAZCO rental; Gelman sciences cartridge filter  
Lot 852173

## PURGING DEVICE

Type Device? disposable poly. bailer  
 How was the device decontaminated? pre-deconned  
 How was the line decontaminated? N/A - dedicated  
 Which well was previously purged? N/A

## SAMPLING DEVICE

Type Device? disposable Teflon bailer  
 How was the device decontaminated? pre-deconned  
 How was the line decontaminated? NA - dedicated  
 Which well was previously sampled? N/A

## INITIAL WELL VOLUME

Well diameter (in.) 2"  
 Stickup (ft.) 2.5'  
 Depth to bottom of well (ft.) 32.84  
 Depth to water surface (ft.) 28.03  
 Length of water (ft.) 4.81  
 Volume of water (ft<sup>3</sup>) 0.7  
 (gal.)  
 Amount of sediment at bottom of well (ft.) NA  
 LNAPL (ft.) not measured DNAPL (ft.) —

## PURGING

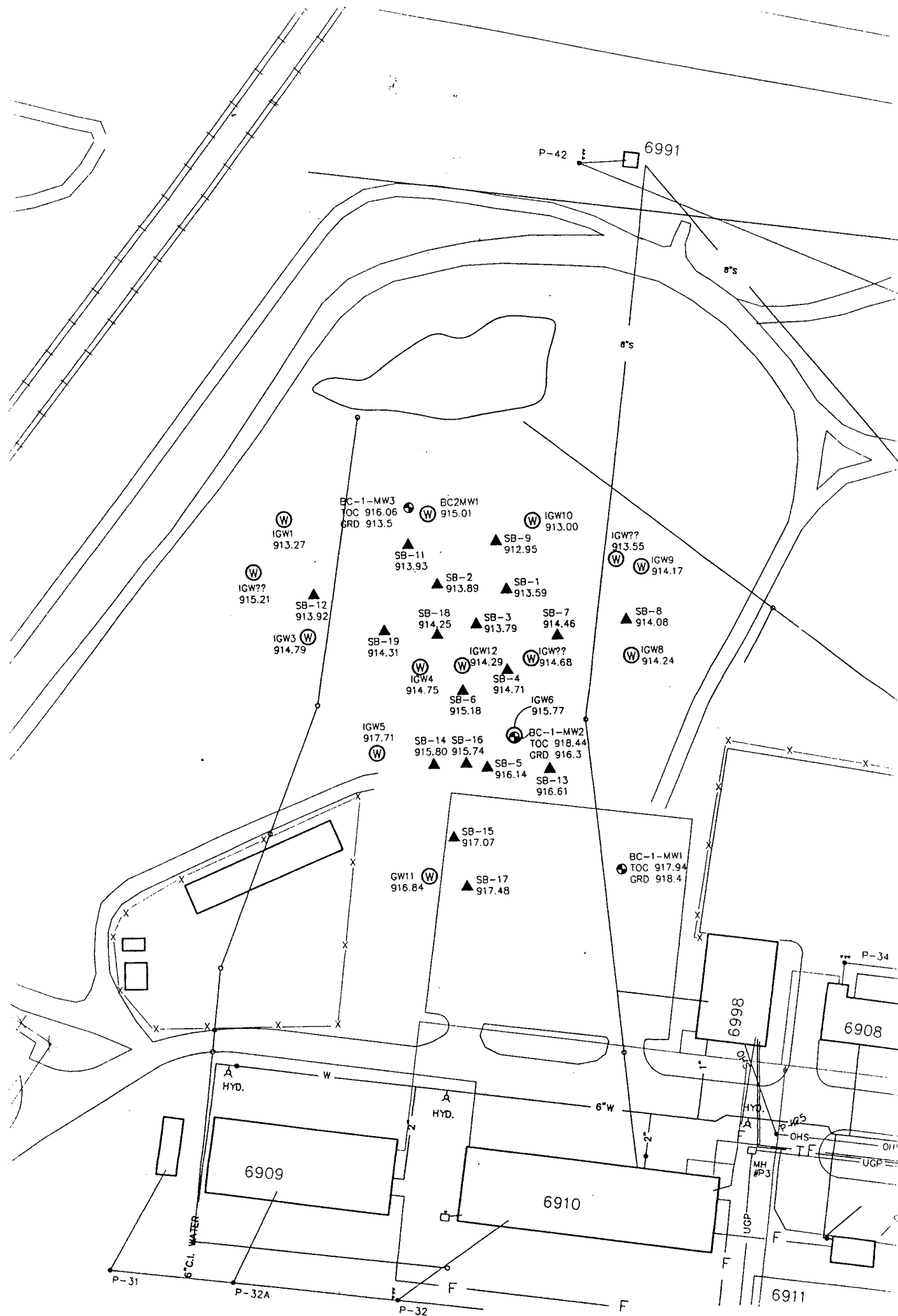
Time started 0840 Finished 0850  
 Volume purged 3.5 gallons  
 Comments on Well Recovery almost instantaneous from previous sampling  
 Additional Comments broken sheen; strong hydrocarbon odor; filtered samples collected through in-line cartridge filter (0.45µm) using peristaltic pump  
 Samples Collected: Start 0920 Finish NA

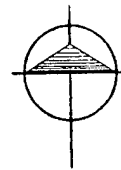
IN-SITU TESTING	Date: <u>5/17</u>	<u>5/17</u>	<u>5/17</u>				
	Time: <u>0840</u>	<u>0850</u>	<u>0920</u>				
Water Level	<u>28.03</u>	<u>28.03</u>	<u>28.03</u>				
Well Volume Purged (gal.)	<u>—</u>	<u>3.5</u>	<u>3.5</u>				
Turbidity	<u>cloudy</u>	<u>turbid</u>	<u>turbid</u>				
Odor	<u>strong hydrocarbon</u>	<u>strong</u>	<u>mod-strong</u>				
Organic Vapor (ppm)	<u>1.3/1.2</u>	<u>NA</u>	<u>NA</u>				
pH (units)	<u>5.38</u>	<u>5.67</u>	<u>6.79</u>				
Conductivity (µ mhos)	<u>974</u>	<u>691</u>	<u>766</u>				
Water Temperature (°C)	<u>53.1°F</u>	<u>51.9°F</u>	<u>51.5°F</u>				

Notes: 1 ft. length of 4" = 0.087 ft<sup>3</sup> or 0.65 gal. 1 ft. length 2" = 0.022 ft<sup>3</sup> or 0.16 gal.  
 Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91



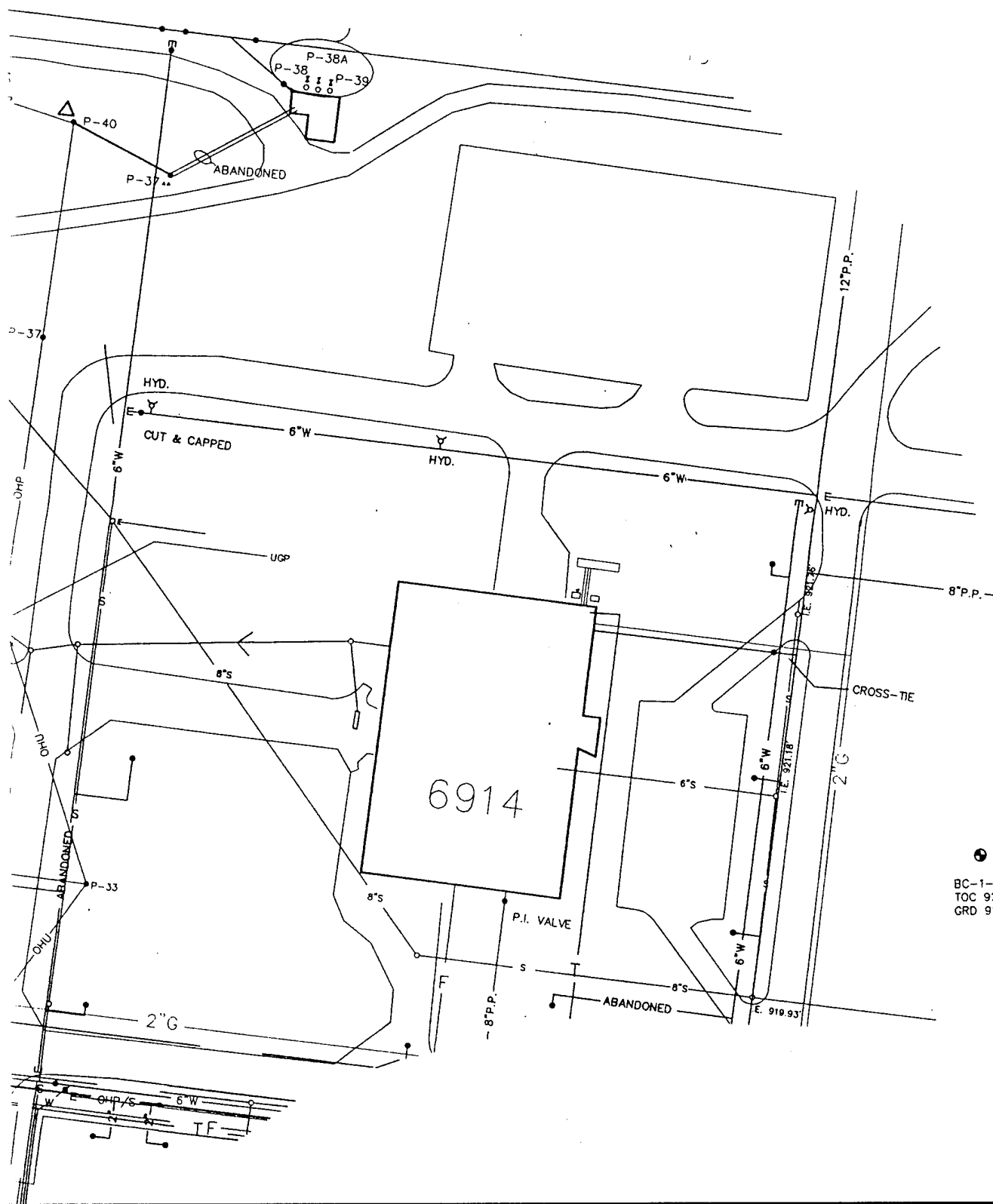
## **APPENDIX J: SURVEYING REPORTS**





0 60 120  
SCALE IN FEET

ROAD



BC-1-MW16  
TOC 926.85  
GRD 927.1

**APPENDIX K: INVESTIGATION DERIVED WASTE  
CORRESPONDENCE**

Pltwe K-20 6-0

August 23, 1994

Captain Fred Vollmerhausen  
Environmental Coordinator  
110th Fighter Group, Michigan Air National Guard  
3545 Mustang Avenue  
Battle Creek, Michigan 49015-5509

Dear Captain Vollmerhausen:

Field sampling activities at the 110th Fighter Group were ongoing from the middle of May to the middle of July, 1994. Approximately 400 to 450 gallons of wastewater generated by purging monitoring wells and decontaminating sampling equipment was containerized in polyethylene tanks and left on site. A composite sample of this wastewater was collected and analyzed for priority pollutant list volatile and semivolatile organic compounds, pesticides, PCBs, and metals (EPA methods 608, 624, and 625) in the WWES Laboratory, Grand Rapids, Michigan. The final report has been mailed to our office and, once received, will be provided to you in a more official version.

Please contact me if you have any questions or comments regarding these matters.

Sincerely,

EARTH TECH  
Government Services Division

  
Jack S. Briegel  
Project Manager

cc: Mr. Dan Wyatt, ANGRC (1 Copy)  
Mr. Tom Cady, HAZWRAP (1 Copy)

File copy K-20 (HAZWRAP)

Telephone

615.483.9404

Facsimile

615.481.3834

E A R T H



T E C H



## ANALYTICAL REPORT

EARTH TECH - OAK RIDGE  
 Proj: 110th Fighter Group  
 MICH A.N.G.  
 Subm: 27-JULY-1994 Sampling

Submittal Number: 32429- 1  
 Location:  
 CCS Number .00  
 CCS Manager: Jack Briegel

Purge Well

Reporting Units  
Limit

Lab Sample No: 93376

Project Specific Fraction Enclosed  
 USEPA 624  
 Project Specific Fraction \* Enclosed  
 USEPA 625  
 Organochlorine Pesticides \* Enclosed  
 USEPA METHOD 608  
 Organochlorine Pesticides \* Enclosed  
 USEPA Method 608

Arsenic, Total	8.6	1.0	ug/l
Cadmium, Total	2.2	0.2	ug/l
Chromium, Total	<50	50	ug/l
Copper, Total	42	10	ug/l
Lead, Total	<1.0	1.0	ug/l
Mercury, Total	<0.2	0.2	ug/l
Nickel, Total	570	10	ug/l
Selenium, Total	<2.0	2.0	ug/l
Silver, Total	<0.2	0.2	ug/l
Zinc, Total	210	20	ug/l
Antimony, Total	<2.0	2.0	ug/l
Thallium, Total	<2.0	2.0	ug/l
Beryllium, Total	<10	10	ug/l

Sampled by: M.C.  
 Date Sampled: 07/27/94  
 Time Sampled: 11:00  
 Date Received: 07/27/94  
 Time Received: 15:40

\* See attached Statement of Data Qualifications.



ANALYTICAL SERVICE

PROJECT SPECIFIC FRACTION  
USEPA 624

EARTH TECH - OAK RIDGE  
Proj: 110th Fighter Group  
MICH A.N.G.  
Subm: 27-JULY-1994 Sampling  
Sample: Purge Well

Submittal Number 32429- 1  
Date Sampled: 07/27/94 Time: 11:00  
Date Received: 07/27/94 Time: 15:40  
Analysis Date: 08/03/94  
Lab Sample No: 93376

Parameter	Result ug/l	Parameter	Result ug/l
1,1,1-Trichloroethane	<1.0	Chloroform	<1.0
1,1,2,2-Tetrachloroethane	<1.0	Chloromethane	<1.0
1,1,2-Trichloroethane	<1.0	cis-1,3-Dichloropropene	<1.0
1,1-Dichloroethane	<1.0	Dibromochloromethane	<1.0
1,1-Dichloroethylene	<1.0	Ethylbenzene	1.1
1,2-Dichloroethylene-	<1.0	Methylene Chloride	<1.0
(total)			
1,2-Dichloroethane	<1.0	Tetrachloroethene	<1.0
1,2-Dichloropropane	<1.0	Toluene	1.5
2-Chloroethyl Vinyl Ether	<10	trans-1,3-Dichloropropene	<1.0
Benzene	1.4	Vinyl Chloride	<1.0
Bromodichloromethane	<1.0	Xylene, Total	<3.0
Bromoform	<1.0	Trichloroethene	<1.0
Bromomethane	<1.0	Acrolein	<15
Carbon Tetrachloride	<1.0	Acrylonitrile	<1.0
Chlorobenzene	1.1	Dichlorodifluoromethane	<10
Chloroethane	<1.0	Trichlorofluoromethane	<1.0



PROJECT SPECIFIC FRACTION  
USEPA 625

EARTH TECH - OAK RIDGE  
Proj: 110th Fighter Group  
MICH A.N.G.  
Subm: 27-JULY-1994 Sampling  
Sample: Purge Well

Submittal Number 32429- 1  
Date Sampled: 07/27/94 Time: 11:00  
Date Received: 07/27/94 Time: 15:40  
Analysis Date: 08/04/94  
Lab Sample No: 93376

Parameter	Result ug/l	Parameter	Result ug/l
2,4-Trichlorobenzene	<5.0	Di-n-Butylphthalate	<5.0
2,4,5-Trichlorophenol	<5.0	Di-n-Octylphthalate	<5.0
2,4,6-Trichlorophenol	<5.0	Dibenzo (a,h) Anthracene	<5.0
2,4-Dichlorophenol	<5.0	Dimethylphthalate	<5.0
2,4-Dimethylphenol	<5.0	Diethylphthalate	10
2,4-Dinitrophenol	<20	Fluoranthene	<5.0
2,4-Dinitrotoluene	<5.0	Fluorene	<5.0
2,6-Dinitrotoluene	<5.0	Hexachlorobenzene	<5.0
2-Chloronaphthalene	<5.0	Hexachlorobutadiene	<5.0
2-Chlorophenol	<5.0	Hexachlorocyclopentadiene	<5.0
2-Methylnaphthalene	<5.0	Hexachloroethane	<5.0
2-Methylphenol	<5.0	Isophorone	<5.0
2-Nitrophenol	<5.0	Indeno (1,2,3-cd) Pyrene	<5.0
4-Bromophenyl Phenylether	<5.0	N-Nitrosodi-n-Propylamine	<5.0
4,6-Dinitro-2-Methylphenol	<20	N-Nitroso-di-Phenylamine	6.0
4-Chloro-3-Methylphenol	<5.0	Naphthalene	<5.0
4-Chlorophenylphenyl-Ether	<5.0	Pentachlorophenol	<50
4-Methylphenol	<5.0	Phenanthrene	<5.0
4-Nitrophenol	<20	Phenol	<5.0
Acenaphthene	<5.0	Pyrene	<5.0
Acenaphthylene	<5.0	1,2-Dichlorobenzene	<5.0
Anthracene	<5.0	1,3-Dichlorobenzene	<5.0
Benzo (a) Anthracene	<5.0	1,4-Dichlorobenzene	<5.0
Benzo (a) Pyrene	<5.0	3,3'-Dichlorobenzidine	<20
Benzo (b&k) Fluoranthene	<5.0	4-Chloroaniline	<20
Benzo (g,h,i,) Perylene	<5.0	Dibenzofuran	<5.0
Benzoic Acid	<50	2-Nitroaniline	<20
Benzyl Alcohol	<50	3-Nitroaniline	<20
Bis (2-Chloroisopropyl)-Ether	<5.0	4-Nitroaniline	<20
Bis (2-Chloroethyl) Ether	<5.0	Nitrobenzene	<5.0
Bis (2-ethylhexyl)-Phthalate	12	Benzidine	<50



PROJECT SPECIFIC FRACTION  
USEPA 625

EARTH TECH - OAK RIDGE  
Proj: 110th Fighter Group  
MICH A.N.G.  
Subm: 27-JULY-1994 Sampling  
Sample: Purge Well

Submittal Number 32429- 1  
Date Sampled: 07/27/94 Time: 11:00  
Date Received: 07/27/94 Time: 15:40  
Analysis Date: 08/04/94  
Lab Sample No: 93376

Parameter	Result ug/l	Parameter	Result ug/l
Bis (2-Chloroethoxy) - Methane	<5.0	1,2-Diphenylhydrazine	<5.0
Butyl Benzyl Phthalate	<5.0	N-Nitroso-di-methylamine	<10
Chrysene	<5.0		

ORGANOCHLORINE PESTICIDES  
USEPA METHOD 608

EARTH TECH - OAK RIDGE  
Proj: 110th Fighter Group  
MICH A.N.G.  
Subm: 27-JULY-1994 Sampling  
Sample: Purge Well

Submittal Number 32429- 1  
Date Sampled: 07/27/94 Time: 11:00  
Date Received: 07/27/94 Time: 15:40  
Analysis Date: 08/18/94  
Lab Sample No: 93376

Parameter	Result ug/l	Parameter	Result ug/l
Aldrin	<1.0	Dieldrin	<1.0
Alpha-BHC	<1.0	Endosulfan I	<1.0
Beta-BHC	<1.0	Endosulfan II	<1.0
Delta-BHC	<1.0	Endosulfan Sulfate	<1.0
Endane	<1.0	Endrin	<1.0
1,4'-DDD	<1.0	Endrin Aldehyde	<1.0
4,4'-DDE	<1.0	Heptachlor	<1.0
1,4'-DDT	<1.0	Heptachlor Epoxide	<1.0

ORGANOCHLORINE PESTICIDES  
USEPA METHOD 608

EARTH TECH - OAK RIDGE  
Proj: 110th Fighter Group  
MICH A.N.G.  
Subm: 27-JULY-1994 Sampling  
Sample: Purge Well

Submittal Number 32429- 1  
Date Sampled: 07/27/94 Time: 11:00  
Date Received: 07/27/94 Time: 15:40  
Analysis Date: 08/02/94  
Lab Sample No: 93376

Parameter	Result ug/l	Parameter	Result ug/l
Chlordane (technical)	<1.0	PCB-1242	<1.0
Toxaphene	<1.0	PCB-1248	<1.0
PCB-1016	<1.0	PCB-1254	<1.0
PCB-1221	<1.0	PCB-1260	<1.0
PCB-1232	<1.0		

Page 6 - End of Analytical Report

March 14, 1995

Captain Fred Vollmerhausen  
Environmental Coordinator  
110th Fighter Group, Michigan Air National Guard  
3545 Mustang Avenue  
Battle Creek, Michigan 49015-5509

Dear Captain Vollmerhausen:

Field sampling activities at the 110th Fighter Group were ongoing from the first of November to the middle of December, 1994. Approximately 750 gallons of wastewater generated by purging monitoring wells and decontaminating sampling equipment was containerized in 2 polyethylene tanks and left on site. A composite sample of this wastewater was collected and analyzed for priority pollutant list volatile and semivolatile organic compounds, pesticides, PCBs, and metals (EPA methods 608, 624, and 625) in the Earth Tech Analytical Laboratory, Grand Rapids, Michigan. Per our phone conversation on January 18, 1995, Mr. Greg Reed of the Earth Tech laboratory services group provided you a preliminary copy of these analytical results. The final report was mailed to our office and is being transmitted to you with this letter.

Telephone

615.483.9404


Facsimile

615.481.3834

Please contact me if you have any questions or comments regarding these matters.

Sincerely,

EARTH TECH  
Government Services Division

  
Jack S. Briegel  
Project Manager

cc: Mr. Paul Wheeler, ANGRC (1 Copy)  
Mr. Tom Cady, HAZWRAP (1 Copy)

Attachments

## ANALYTICAL REPORT

EARTH TECH - OAK RIDGE  
Proj: 110th Fighter Group  
MICH A.N.G.  
Subm: 19-December-1994 Sampling

Submittal Number: 32429- 8  
Location:  
CCS Number .00  
CCS Manager: Jack Briegel

BCWW  
121994

Reporting Units  
Limit

Lab Sample No: 106548

Project Specific Fraction Enclosed  
USEPA 624

Project Specific Fraction Enclosed  
USEPA 625

Organochlorine Pesticides \* Enclosed  
USEPA METHOD 608

Organochlorine Pesticides \* Enclosed  
USEPA Method 608

Arsenic, Total	5.7	1.0	ug/l
Cadmium, Total	1.6	0.2	ug/l
Chromium, Total	110	50	ug/l
Copper, Total	65	10	ug/l
Lead, Total	74	1.0	ug/l
Mercury, Total	<0.2	0.2	ug/l
Nickel, Total	710	10	ug/l
Selenium, Total	<2.0	2.0	ug/l
Silver, Total	<0.2	0.2	ug/l
Zinc, Total	660	20	ug/l
Antimony, Total	<2.0	2.0	ug/l
Thallium, Total	<2.0	2.0	ug/l
Beryllium, Total	<10	10	ug/l

Sampled by: J. Briegel  
Date Sampled: 12/19/94  
Time Sampled: 12:00  
Date Received: 12/19/94  
Time Received: 14:25

\* See attached Statement of Data Qualifications.

Page 1

PROJECT SPECIFIC FRACTION  
USEPA 624

EARTH TECH - OAK RIDGE  
Proj: 110th Fighter Group  
MICH A.N.G.  
Subm: 19-December-1994 Sampling  
Sample: BCWW  
121994

Submittal Number 32429- 8  
Date Sampled: 12/19/94 Time: 12:00  
Date Received: 12/19/94 Time: 14:25  
Analysis Date: 12/31/94  
Lab Sample No: 106548

Parameter	Result	Reporting Limit
	ug/l	ug/l
1,1,1-Trichloroethane	<1.0	1.0
1,1,2,2-Tetrachloroethane	<1.0	1.0
1,1,2-Trichloroethane	<1.0	1.0
1,1-Dichloroethane	<1.0	1.0
1,1-Dichloroethylene	<1.0	1.0
1,2-Dichloroethylene-	<2.0	2.0
(total)		
1,2-Dichloroethane	<1.0	1.0
1,2-Dichloropropane	<1.0	1.0
2-Chloroethyl Vinyl Ether	<10	10
Benzene	<1.0	1.0
Bromodichloromethane	<1.0	1.0
Bromoform	<1.0	1.0
Bromomethane	<1.0	1.0
Carbon Tetrachloride	<1.0	1.0
Chlorobenzene	<1.0	1.0
Chloroethane	<1.0	1.0
Chloroform	<1.0	1.0
Chloromethane	<1.0	1.0
cis-1,3-Dichloropropylene	<1.0	1.0
Dibromochloromethane	<1.0	1.0
Ethylbenzene	<1.0	1.0
Methylene Chloride	<1.0	1.0
Tetrachloroethylene	<1.0	1.0
Toluene	<1.0	1.0
trans-1,3-Dichloropropene	<1.0	1.0
Vinyl Chloride	<1.0	1.0
Xylene, Total	<3.0	3.0
Trichloroethylene	<1.0	1.0
Acrolein	* <15	15
Acrylonitrile	<1.0	1.0
Dichlorodifluoromethane	<10	10
Trichlorofluoromethane	<1.0	1.0

\* See attached Statement of Data Qualifications.

PROJECT SPECIFIC FRACTION  
USEPA 625

EARTH TECH - OAK RIDGE

Proj: 110th Fighter Group

MICH A.N.G.

Subm: 19-December-1994 Sampling

Sample: BCWW  
121994

Submittal Number 32429- 8

Date Sampled: 12/19/94 Time: 12:00

Date Received: 12/19/94 Time: 14:25

Analysis Date: 12/28/94

Lab Sample No: 106548

Parameter	Result ug/l	Reporting Limit ug/l
1,2,4-Trichlorobenzene	<5.0	5.0
2,4,5-Trichlorophenol	<5.0	5.0
2,4,6-Trichlorophenol	<5.0	5.0
2,4-Dichlorophenol	<5.0	5.0
2,4-Dimethylphenol	<5.0	5.0
2,4-Dinitrophenol	<20	20
2,4-Dinitrotoluene	<5.0	5.0
2,6-Dinitrotoluene	<5.0	5.0
2-Chloronaphthalene	<5.0	5.0
2-Chlorophenol	<5.0	5.0
2-Methylnaphthalene	7.0	5.0
2-Methylphenol	<5.0	5.0
2-Nitrophenol	<5.0	5.0
4-Bromophenyl Phenylether	<5.0	5.0
4,6-Dinitro-	<20	20
2-Methylphenol		
4-Chloro-3-Methylphenol	<5.0	5.0
4-Chlorophenylphenyl-	<5.0	5.0
Ether		
4-Methylphenol	<5.0	5.0
4-Nitrophenol	<20	20
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Benzoic Acid	<50	50
Benzyl Alcohol	<50	50
Bis (2-Chloroisopropyl)-	<5.0	5.0
Ether		
Bis (2-Chloroethyl) Ether	<5.0	5.0
Bis (2-ethylhexyl)-	<5.0	5.0
Phthalate		

PROJECT SPECIFIC FRACTION  
USEPA 625

EARTH TECH - OAK RIDGE  
Proj: 110th Fighter Group  
MICH A.N.G.  
Subm: 19-December-1994 Sampling  
Sample: BCWW  
121994

Submittal Number 32429- 8  
Date Sampled: 12/19/94 Time: 12:00  
Date Received: 12/19/94 Time: 14:25  
Analysis Date: 12/28/94  
Lab Sample No: 106548

Parameter	Result	Reporting Limit
	ug/l	ug/l
Bis (2-Chloroethoxy)- Methane	<5.0	5.0
Butyl Benzyl Phthalate	<5.0	5.0
Chrysene	<5.0	5.0
Di-n-Butylphthalate	<5.0	5.0
Di-n-Octylphthalate	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Dimethylphthalate	<5.0	5.0
Diethylphthalate	<5.0	5.0
Fluoranthene	<5.0	5.0
Fluorene	<5.0	5.0
Hexachlorobenzene	<5.0	5.0
Hexachlorobutadiene	<5.0	5.0
Hexachlorocyclopentadiene	<5.0	5.0
Hexachloroethane	<5.0	5.0
Isophorone	<5.0	5.0
Indeno (1,2,3-cd) Pyrene	<5.0	5.0
N-Nitrosodi-n-Propylamine	<5.0	5.0
N-Nitroso-di-Phenylamine	<5.0	5.0
Naphthalene	<5.0	5.0
Pentachlorophenol	<20	20
Phenanthrene	<5.0	5.0
Phenol	<5.0	5.0
Pyrene	<5.0	5.0
1,2-Dichlorobenzene	<5.0	5.0
1,3-Dichlorobenzene	<5.0	5.0
1,4-Dichlorobenzene	<5.0	5.0
3,3'-Dichlorobenzidine	<20	20
4-Chloroaniline	<20	20
Dibenzofuran	<5.0	5.0
2-Nitroaniline	<20	20
3-Nitroaniline	<20	20
4-Nitroaniline	<20	20
Nitrobenzene	<5.0	5.0
Benzidine	<50	50



PROJECT SPECIFIC FRACTION  
USEPA 625

EARTH TECH - OAK RIDGE  
Proj: 110th Fighter Group  
MICH A.N.G.  
Subm: 19-December-1994 Sampling  
Sample: BCWW  
121994

Submittal Number 32429- 8  
Date Sampled: 12/19/94 Time: 12:00  
Date Received: 12/19/94 Time: 14:25  
Analysis Date: 12/28/94  
Lab Sample No: 106548

Parameter	Result	Reporting Limit
	ug/l	ug/l
1,2-Diphenylhydrazine	<5.0	5.0
N-Nitroso-di-methylamine	<10	10

ORGANOCHLORINE PESTICIDES  
USEPA METHOD 608

EARTH TECH - OAK RIDGE  
Proj: 110th Fighter Group  
MICH A.N.G.  
Subm: 19-December-1994 Sampling  
Sample: BCWW  
121994

Submittal Number 32429- 8  
Date Sampled: 12/19/94 Time: 12:00  
Date Received: 12/19/94 Time: 14:25  
Analysis Date: 01/11/95  
Lab Sample No: 106548

Parameter	Result ug/l	Reporting Limit ug/l
Aldrin	<1.0	1.0
Alpha-BHC	<1.0	1.0
Beta-BHC	<1.0	1.0
Delta-BHC	<1.0	1.0
Lindane	<1.0	1.0
4,4'-DDD	<1.0	1.0
4,4'-DDE	<1.0	1.0
4,4'-DDT	<1.0	1.0
Dieldrin	<1.0	1.0
Endosulfan I	<1.0	1.0
Endosulfan II	<1.0	1.0
Endosulfan Sulfate	<1.0	1.0
Endrin	<1.0	1.0
Endrin Aldehyde	<1.0	1.0
Heptachlor	<1.0	1.0
Heptachlor Epoxide	<1.0	1.0

ORGANOCHLORINE PESTICIDES  
USEPA METHOD 608

EARTH TECH - OAK RIDGE  
Proj: 110th Fighter Group  
MICH A.N.G.  
Subm: 19-December-1994 Sampling  
Sample: BCWW  
121994

Submittal Number 32429- 8  
Date Sampled: 12/19/94 Time: 12:00  
Date Received: 12/19/94 Time: 14:25  
Analysis Date: 12/30/94  
Lab Sample No: 106548

Parameter	Result	Reporting Limit
	ug/l	ug/l
Chlordane (technical)	<1.0	1.0
Toxaphene	<1.0	1.0
PCB-1016	<1.0	1.0
PCB-1221	<1.0	1.0
PCB-1232	<1.0	1.0
PCB-1242	<1.0	1.0
PCB-1248	<1.0	1.0
PCB-1254	<1.0	1.0
PCB-1260	<1.0	1.0

Page 7 - End of Analytical Report

March 21, 1995

Captain Fred Vollmerhausen  
Environmental Coordinator  
110th Fighter Group, Michigan Air National Guard  
3545 Mustang Avenue  
Battle Creek, Michigan 49015-5509

Dear Captain Vollmerhausen:

A hollow stem auger drilling rig was used to advance five boreholes (four at Site 1 and one east of Building 6914) at the Air National Guard facility during December 1994. The auger cuttings which were removed from these boreholes were either drummed or placed on plastic sheeting next to the boring from which they were removed. The well and cuttings locations are included on Attachment I. All of the soil or groundwater analytical results associated with the boring/wells are presented on Attachment II. Soil samples for laboratory analysis were only collected from one borehole, BC1MW2. Well numbers and locations, samples collected from each boring, and cuttings disposition are included on Attachment III.

Telephone

615.483.9404

Facsimile

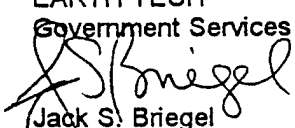
615.481.3834

On February 22, 1995 I contacted Ms. Lori Aronoff, Environmental Quality Analyst for the Michigan Department of Natural Resources for guidance regarding the disposition of these cuttings. Ms. Aronoff indicated to me that cuttings should not be disposed of by the well or on clean soils if soil samples collected from these borings contain compounds which exceed the Michigan Environmental Response Act 307 Type B direct contact or Type A values. The soil samples collected from well location 1MW2 (10 to 12 and 20 to 22 foot bgs intervals) were analyzed for VOCs, SVOCs, and metals. Only selenium and/or arsenic were detected in concentrations which exceed the cleanup criteria. She did state that it was acceptable practice to combine contaminated soils with other similarly contaminated soils, i.e. other sites where similar types of contamination exists. Placing the cuttings in the Drainage Swale (Site 2) prior to covering this area with the earthen cover would be one option to consider. Data presented in the Site 2 Source Removal Action Plan (Engineering-Science, 1994) shows that sediments at the bottom of the drainage swale contain polynuclear aromatic hydrocarbons and metals above the Type A and B cleanup criteria. These contaminants are the primary contaminants of concern within the Site 1 soils and groundwater.

Please contact me if you have any questions or comments regarding these matters.

Sincerely,

EARTH TECH  
Government Services Division

  
Jack S. Briegel  
Project Manager

cc: Mr. Paul Wheeler, ANGRC (1 Copy)  
Mr. Tom Cady, HAZWRAP (1 Copy)

Attachments

**ATTACHMENT I**

**LOCATION MAP**



## Attachment II

Location	Well #	Samples	Cuttings Location
Site 1 (located in parking lot next to AGE shop)	BC1MW1	groundwater only; PID readings during drilling were 0 ppm; located outside of contaminated Site 1 soils	cuttings are located on the northern edge of the parking lot covered in plastic
Site 1	BC1MW2	soil samples 1MW21012 and 1MW22022 were collected from this boring (a); PID readings during drilling (to water table) were 0 ppm	suspected product in well; cuttings from the surface to the water table were drummed and left by the well; cuttings from the water table to total depth were placed in two drums, labelled, and combined with the BC1MW3 saturated cuttings
Site 1 (located on the eastern edge of Site 1)	BC1TMW3	groundwater samples only; PID readings during drilling were 0 ppm; located outside of contaminated Site 1 soils	drilled outside of known contaminated soil plume; cuttings were left on plastic by boring
Site 1 (located next to BC2MW1)	BC1MW3	groundwater samples only; PID readings during drilling were 0 ppm; located outside of contaminated Site 1 soils	located next to BC2MW1; cuttings from surface to water table were left on plastic by the well; cuttings from the water table to total depth were placed in 2 drums, labelled, and combined with the BC1MW2 cuttings
In parade ground	BCMW16	groundwater samples only; PID readings during drilling were 0 ppm; located in an area where soil contamination should not be present	cuttings were covered in plastic and left by the well

**ATTACHMENT III**  
**ANALYTICAL RESULTS**



1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

1MW21012

Lab Name: COMPUCHEM ENV. CORP.

Contract: 500639

Lab Code: COMPU

Case No.: 29839

SAS No.:

SDG No.: 00011

Matrix: (soil/water) SOIL

Lab Sample ID: 670471

Sample wt/vol: 5.0 (g/mL) G

Lab File ID: GH070471A52.D

Level: (low/med) LOW

Date Received: 12/17/94

% Moisture: not dec. 7

Date Analyzed: 12/28/94

GC Column: DB624

ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: \_\_\_\_\_ (uL)

Soil Aliquot Volume: \_\_\_\_\_ (uL)

CONCENTRATION UNITS:

CAS NO.

COMPOUND

(ug/L or ug/Kg) UG/KG

Q

74-87-3-----	Chloromethane	11	U
74-83-9-----	Bromomethane	5	U
75-01-4-----	Vinyl Chloride	11	U
75-00-3-----	Chloroethane	11	U
75-09-2-----	Methylene Chloride	21	B
67-64-1-----	Acetone	19	
75-15-0-----	Carbon Disulfide	5	U
75-35-4-----	1,1-Dichloroethene	5	U
75-34-3-----	1,1-Dichloroethane	5	U
67-66-3-----	Chloroform	5	U
107-06-2-----	1,2-Dichloroethane	5	U
78-93-3-----	2-Butanone	22	U
71-55-6-----	1,1,1-Trichloroethane	5	U
56-23-5-----	Carbon Tetrachloride	5	U
75-27-4-----	Bromodichloromethane	5	U
78-87-5-----	1,2-Dichloropropane	5	U
10061-01-5-----	cis-1,3-Dichloropropene	5	U
79-01-6-----	Trichloroethene	5	U
124-48-1-----	Dibromochloromethane	5	U
79-00-5-----	1,1,2-Trichloroethane	5	U
71-43-2-----	Benzene	5	U
10061-02-6-----	trans-1,3-Dichloropropene	5	U
75-25-2-----	Bromoform	11	U
108-10-1-----	4-Methyl-2-Pentanone	16	U
591-78-6-----	2-Hexanone	16	U
127-18-4-----	Tetrachloroethene	5	U
79-34-5-----	1,1,2,2-Tetrachloroethane	11	U
108-88-3-----	Toluene	5	U
108-90-7-----	Chlorobenzene	5	U
100-41-4-----	Ethylbenzene	5	U
100-42-5-----	Styrene	5	U
1330-20-7-----	Xylene (total)	16	U
108-05-4-----	Vinyl Acetate	11	U

DRAFT

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

1MW21012

Lab Name: COMPUCHEM ENV. CORP.

Contract: 500639

Lab Code: COMPU

Case No.: 29839

SAS No.:

SDG No.: 00011

Matrix: (soil/water) SOIL

Lab Sample ID: 670471

Sample wt/vol: 5.0 (g/mL) G

Lab File ID: GH070471A52.D

Level: (low/med) LOW

Date Received: 12/17/94

% Moisture: not dec. 7

Date Analyzed: 12/28/94

GC Column: DB624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: \_\_\_\_\_ (uL)

Soil Aliquot Volume: \_\_\_\_\_ (uL)

CAS NO. COMPOUND CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG Q

156-60-5-----trans-1,2-Dichloroethene_____	5	U
156-59-2-----cis-1,2-Dichloroethene_____	5	U

DRAFT

15  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

1MW21012

Lab Name: COMPUCHEM ENV. CORP.

Contract: (3-90)-REVS

Lab Code: COMPU

Case No.: 29839

SAS No.:

SDG No.: 00043

Matrix: (soil/water) SOIL

Lab Sample ID: 670463

Sample wt/vol: 30.1 (g/mL) G

Lab File ID: GH070463A08.D

Level: (low/med) LOW

Date Received: 12/17/94

% Moisture: 7 decanted: (Y/N) N

Date Extracted: 12/28/94

Concentrated Extract Volume: 500 (uL)

Date Analyzed: 01/23/95

Injection Volume: 2.0 (uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.3

DRAFT

CAS NO. COMPOUND CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG Q

108-95-2-----	Phenol	350	U
111-44-4-----	bis(2-Chloroethyl) ether	350	U
95-57-8-----	2-Chlorophenol	350	U
541-73-1-----	1,3-Dichlorobenzene	350	U
106-46-7-----	1,4-Dichlorobenzene	350	U
95-50-1-----	1,2-Dichlorobenzene	350	U
95-48-7-----	2-Methylphenol	350	U
108-60-1-----	2,2'-oxybis(1-Chloropropane)	350	U
106-44-5-----	4-Methylphenol	350	U
621-64-7-----	N-Nitroso-di-n-propylamine	350	U
67-72-1-----	Hexachloroethane	350	U
98-95-3-----	Nitrobenzene	350	U
78-59-1-----	Isophorone	350	U
88-75-5-----	2-Nitrophenol	350	U
105-67-9-----	2,4-Dimethylphenol	350	U
111-91-1-----	bis(2-Chloroethoxy) methane	350	U
120-83-2-----	2,4-Dichlorophenol	350	U
120-82-1-----	1,2,4-Trichlorobenzene	350	U
91-20-3-----	Naphthalene	350	U
106-47-8-----	4-Chloroaniline	350	U
87-68-3-----	Hexachlorobutadiene	350	U
59-50-7-----	4-Chloro-3-methylphenol	350	U
91-57-6-----	2-Methylnaphthalene	350	U
77-47-4-----	Hexachlorocyclopentadiene	350	U
88-06-2-----	2,4,6-Trichlorophenol	350	U
95-95-4-----	2,4,5-Trichlorophenol	860	U
91-58-7-----	2-Chloronaphthalene	350	U
88-74-4-----	2-Nitroaniline	860	U
131-11-3-----	Dimethylphthalate	350	U
208-96-8-----	Acenaphthylene	350	U
606-20-2-----	2,6-Dinitrotoluene	350	U
99-09-2-----	3-Nitroaniline	860	U
83-32-9-----	Acenaphthene	350	U

FORM I SV-1

3/90

29839 00043 SAMPLE DATA SUMMARY

936

1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

1MW21012

Lab Name: COMPUCHEM ENV. CORP.

Contract: (3-90)-REVS

Lab Code: COMPU

Case No.: 29839

SAS No.:

SDG No.: 00043

Matrix: (soil/water) SOIL

Lab Sample ID: 670463

Sample wt/vol: 30.1 (g/mL) G.

Lab File ID: GH070463A08.D

Level: (low/med) LOW

Date Received: 12/17/94

% Moisture: 7 decanted: (Y/N) N

Date Extracted: 12/28/94

Concentrated Extract Volume: 500 (uL)

Date Analyzed: 01/23/95

Injection Volume: 2.0 (uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.3

DRAFT

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) UG/KG	Q
---------	----------	--	---

51-28-5-----	2,4-Dinitrophenol	860	U
100-02-7-----	4-Nitrophenol	860	U
132-64-9-----	Dibenzofuran	350	U
121-14-2-----	2,4-Dinitrotoluene	350	U
84-66-2-----	Diethylphthalate	350	U
7005-72-3-----	4-Chlorophenyl-phenylether	350	U
86-73-7-----	Fluorene	350	U
100-01-6-----	4-Nitroaniline	860	U
534-52-1-----	4,6-Dinitro-2-methylphenol	860	U
86-30-6-----	N-nitrosodiphenylamine (1)	350	U
101-55-3-----	4-Bromophenyl-phenylether	350	U
118-74-1-----	Hexachlorobenzene	350	U
87-86-5-----	Pentachlorophenol	860	U
85-01-8-----	Phenanthrene	350	U
120-12-7-----	Anthracene	350	U
86-74-8-----	Carbazole	350	U
84-74-2-----	Di-n-butylphthalate	68	JB
206-44-0-----	Fluoranthene	350	U
129-00-0-----	Pyrene	350	U
85-68-7-----	Butylbenzylphthalate	350	U
91-94-1-----	3,3'-Dichlorobenzidine	350	U
56-55-3-----	Benzo (a) anthracene	350	U
218-01-9-----	Chrysene	350	U
117-81-7-----	bis (2-Ethylhexyl) phthalate	350	U
117-84-0-----	Di-n-octylphthalate	350	U
205-99-2-----	Benzo (b) fluoranthene	350	U
207-08-9-----	Benzo (k) fluoranthene	350	U
50-32-8-----	Benzo (a) pyrene	350	U
193-39-5-----	Indeno (1,2,3-cd) pyrene	350	U
53-70-3-----	Dibenzo (a,h) anthracene	350	U
191-24-2-----	Benzo (g,h,i) perylene	350	U
90-12-0-----	1-Methylnaphthalene	350	U

(1) - Cannot be separated from Diphenylamine

FORM I SV-2

3/90

29839 00043 SAMPLE DATA SUMMARY

935



1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

1MW22022

Lab Name: COMPUCHEM ENV. CORP.

Contract: 500639

Lab Code: COMPU

Case No.: 29839

SAS No.:

SDG No.: 00011

Matrix: (soil/water) SOIL

Lab Sample ID: 670467

Sample wt/vol: 5.0 (g/mL) G

Lab File ID: GH070467A52.D

Level: (low/med) LOW

Date Received: 12/17/94

% Moisture: not dec. 2

Date Analyzed: 12/28/94

GC Column: DB624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: \_\_\_\_\_ (uL)

Soil Aliquot Volume: \_\_\_\_\_ (uL)

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG

CAS NO.

COMPOUND

Q

74-87-3-----	Chloromethane	10	U
74-83-9-----	Bromomethane	5	U
75-01-4-----	Vinyl Chloride	10	U
75-00-3-----	Chloroethane	10	U
75-09-2-----	Methylene Chloride	22	B
67-64-1-----	Acetone	10	U
75-15-0-----	Carbon Disulfide	5	U
75-35-4-----	1,1-Dichloroethene	5	U
75-34-3-----	1,1-Dichloroethane	5	U
67-66-3-----	Chloroform	5	U
107-06-2-----	1,2-Dichloroethane	5	U
78-93-3-----	2-Butanone	20	U
71-55-6-----	1,1,1-Trichloroethane	5	U
56-23-5-----	Carbon Tetrachloride	5	U
75-27-4-----	Bromodichloromethane	5	U
78-87-5-----	1,2-Dichloropropane	5	U
10061-01-5-----	cis-1,3-Dichloropropene	5	U
79-01-6-----	Trichloroethene	5	U
124-48-1-----	Dibromochloromethane	5	U
79-00-5-----	1,1,2-Trichloroethane	5	U
71-43-2-----	Benzene	5	U
10061-02-6-----	trans-1,3-Dichloropropene	5	U
75-25-2-----	Bromoform	10	U
108-10-1-----	4-Methyl-2-Pentanone	15	U
591-78-6-----	2-Hexanone	15	U
127-18-4-----	Tetrachloroethene	5	U
79-34-5-----	1,1,2,2-Tetrachloroethane	10	U
108-88-3-----	Toluene	5	U
108-90-7-----	Chlorobenzene	5	U
100-41-4-----	Ethylbenzene	5	U
100-42-5-----	Styrene	5	U
1330-20-7-----	Xylene (total)	15	U
108-05-4-----	Vinyl Acetate	10	U

DRAFT

page 1 of 2

FORM 1.1A

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

1MW22022

Lab Name: COMPUCHEM ENV. CORP.

Contract: 500639

Lab Code: COMPU

Case No.: 29839

SAS No.:

SDG No.: 00011

Matrix: (soil/water) SOIL

Lab Sample ID: 670467

Sample wt/vol: 5.0 (g/mL) G

Lab File ID: GH070467A52.D

Level: (low/med) LOW

Date Received: 12/17/94

% Moisture: not dec. 2

Date Analyzed: 12/28/94

GC Column: DB624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: \_\_\_\_\_ (uL)

Soil Aliquot Volume: \_\_\_\_\_ (uL)

CAS NO.

COMPOUND

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG

Q

156-60-5-----trans-1,2-Dichloroethene	5	U
156-59-2-----cis-1,2-Dichloroethene	5	U

DRAFT

1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

1MW22022

Lab Name: COMPUCHEM ENV. CORP.

Contract: (3-90)-REVS

Lab Code: COMPU

Case No.: 29839

SAS No.:

SDG No.: 00043

Matrix: (soil/water) SOIL

Lab Sample ID: 670462

Sample wt/vol: 30.1 (g/mL) G

Lab File ID: GH070462A08.D

Level: (low/med) LOW

Date Received: 12/17/94

% Moisture: 2 decanted: (Y/N) N

Date Extracted: 12/28/94

Concentrated Extract Volume: 500 (uL)

Date Analyzed: 01/23/95

Injection Volume: 2.0 (uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.3

DRAFT

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
---------	----------	---	---

108-95-2-----	Phenol	340	U
111-44-4-----	bis(2-Chloroethyl) ether	340	U
95-57-8-----	2-Chlorophenol	340	U
541-73-1-----	1,3-Dichlorobenzene	340	U
106-46-7-----	1,4-Dichlorobenzene	340	U
95-50-1-----	1,2-Dichlorobenzene	340	U
95-48-7-----	2-Methylphenol	340	U
108-60-1-----	2,2'-oxybis(1-Chloropropane)	340	U
106-44-5-----	4-Methylphenol	340	U
621-64-7-----	N-Nitroso-di-n-propylamine	340	U
67-72-1-----	Hexachloroethane	340	U
98-95-3-----	Nitrobenzene	340	U
78-59-1-----	Isophorone	340	U
88-75-5-----	2-Nitrophenol	340	U
105-67-9-----	2,4-Dimethylphenol	340	U
111-91-1-----	bis(2-Chloroethoxy) methane	340	U
120-83-2-----	2,4-Dichlorophenol	340	U
120-82-1-----	1,2,4-Trichlorobenzene	340	U
91-20-3-----	Naphthalene	340	U
106-47-8-----	4-Chloroaniline	340	U
87-68-3-----	Hexachlorobutadiene	340	U
59-50-7-----	4-Chloro-3-methylphenol	340	U
91-57-6-----	2-Methylnaphthalene	340	U
77-47-4-----	Hexachlorocyclopentadiene	340	U
88-06-2-----	2,4,6-Trichlorophenol	340	U
95-95-4-----	2,4,5-Trichlorophenol	810	U
91-58-7-----	2-Chloronaphthalene	340	U
88-74-4-----	2-Nitroaniline	810	U
131-11-3-----	Dimethylphthalate	340	U
208-96-8-----	Acenaphthylene	340	U
606-20-2-----	2,6-Dinitrotoluene	340	U
99-09-2-----	3-Nitroaniline	810	U
83-32-9-----	Acenaphthene	340	U



1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

1MW22022

Lab Name: COMPUCHEM ENV. CORP. Contract: (3-90)-REVS  
 Lab Code: COMPU Case No.: 29839 SAS No.: SDG No.: 00043  
 Matrix: (soil/water) SOIL Lab Sample ID: 670462  
 Sample wt/vol: 30.1 (g/mL) G Lab File ID: GH070462A08.D  
 Level: (low/med) LOW Date Received: 12/17/94  
 % Moisture: 2 decanted: (Y/N) N Date Extracted: 12/28/94  
 Concentrated Extract Volume: 500 (uL) Date Analyzed: 01/23/95  
 Injection Volume: 2.0 (uL) Dilution Factor: 1.0  
 GPC Cleanup: (Y/N) Y pH: 7.3

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG

DRAFT

CAS NO.

COMPOUND

51-28-5-----	2,4-Dinitrophenol	810	U
100-02-7-----	4-Nitrophenol	810	U
132-64-9-----	Dibenzofuran	340	U
121-14-2-----	2,4-Dinitrotoluene	340	U
84-66-2-----	Diethylphthalate	340	U
7005-72-3-----	4-Chlorophenyl-phenylether	340	U
86-73-7-----	Fluorene	340	U
100-01-6-----	4-Nitroaniline	810	U
534-52-1-----	4,6-Dinitro-2-methylphenol	810	U
86-30-6-----	N-nitrosodiphenylamine (1)	340	U
101-55-3-----	4-Bromophenyl-phenylether	340	U
118-74-1-----	Hexachlorobenzene	340	U
87-86-5-----	Pentachlorophenol	810	U
85-01-8-----	Phenanthrene	340	U
120-12-7-----	Anthracene	340	U
86-74-8-----	Carbazole	340	U
84-74-2-----	Di-n-butylphthalate	35	JB
206-44-0-----	Fluoranthene	340	U
129-00-0-----	Pyrene	340	U
85-68-7-----	Butylbenzylphthalate	340	U
91-94-1-----	3,3'-Dichlorobenzidine	340	U
56-55-3-----	Benzo(a)anthracene	340	U
218-01-9-----	Chrysene	340	U
117-81-7-----	bis(2-Ethylhexyl)phthalate	340	U
117-84-0-----	Di-n-octylphthalate	340	U
205-99-2-----	Benzo(b)fluoranthene	340	U
207-08-9-----	Benzo(k)fluoranthene	340	U
50-32-8-----	Benzo(a)pyrene	340	U
193-39-5-----	Indeno(1,2,3-cd)pyrene	340	U
53-70-3-----	Dibenzo(a,h)anthracene	340	U
191-24-2-----	Benzo(g,h,i)perylene	340	U
90-12-0-----	1-Methylnaphthalene	340	U

(1) - Cannot be separated from Diphenylamine

FORM I SV-2

3/90



1D  
HALOGENATED VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

BC1MW1GW5

Lab Name: COMPUCHEM, RTP

Contract:

Lab Code: COMPU Case No.: 29839 SAS No.:

SDG No.: 00003

Matrix: (soil/water) WATER

Lab Sample ID: 671281

Sample wt/vol: 5.0(g/ml)ML

Date Received: 12/20/94

Moisture: decanted: (Y/N)

Date Analyzed: 12/30/94

Dilution Factor: 1 pH:

CAS NO. COMPOUND CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L Q

74-87-3-----	Chloromethane	0.50	U
75-01-4-----	VinylChloride	0.55	U
74-83-9-----	Bromomethane	0.45	U
75-00-3-----	Chloroethane	0.50	U
75-35-4-----	1,1-Dichloroethene	0.35	U
75-09-2-----	Methylene Chloride	1.2	PB
156-60-5-----	t-1,2-Dichloroethene	0.30	U
75-34-3-----	1,1-Dichloroethane	0.35	U
67-66-3-----	Chloroform	0.35	U
74-97-5-----	Bromochloromethane	0.25	U
71-55-6-----	1,1,1-Trichloroethane	0.35	U
56-23-5-----	Carbon Tetrachloride	0.35	U
107-06-2-----	1,2-Dichloroethane	0.25	U
79-01-6-----	Trichloroethene	0.30	U
78-87-5-----	1,2-Dichloropropane	0.30	U
75-27-4-----	Bromodichloromethane	0.40	U
74-95-3-----	Dibromomethane	0.40	U
110-75-8-----	2-CEVE	0.40	U
10061-01-5-----	c-1,3-Dichloropropene	0.30	U
10061-02-6-----	t-1,3-Dichloropropene	0.25	U
79-00-5-----	1,1,2-Trichloroethane	0.25	U
127-18-4-----	Tetrachloroethene	0.26	JB
124-48-1-----	Dibromochloromethane	0.30	U
106-93-4-----	1,2-Dibromoethane	0.35	U
108-90-7-----	Chlorobenzene	0.35	U
630-20-6-----	1,1,1,2-Tetrachloroethane	0.35	U
75-25-2-----	Bromoform	0.50	U
79-34-5-----	1,1,2,2-TCA	0.40	U
96-18-4-----	1,2,3-Trichloropropane	0.35	U
108-86-1-----	Bromobenzene	0.85	U
95-49-8-----	2-Chlorotoluene	0.25	U
106-43-4-----	4-Chlorotoluene	0.35	U
541-73-1-----	1,3-Dichlorobenzene	0.20	U
106-46-7-----	1,4-Dichlorobenzene	0.20	U
95-50-1-----	1,2-Dichlorobenzene	0.30	U

1D  
AROMATIC VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

BC1MW1GW5

Lab Name: COMPUCHEM, RTP

Contract:

Lab Code: COMPU Case No.: 29839 SAS No.: SDG No.: 00003

Matrix: (soil/water) WATER Lab Sample ID: 671281

Sample wt/vol: 5.0 (g/ml) ML Date Received: 12/20/94

% Moisture: decanted: (Y/N) Date Analyzed: 12/30/94

Dilution Factor: 1 pH:

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L

Q

CAS NO.

COMPOUND

74-87-3-----Methyl-t-butyl ether	5.0	U
71-43-2-----Benzene	0.35	U
108-88-3-----Toluene	0.25	U
108-90-7-----Chlorobenzene	0.25	U
100-41-4-----Ethylbenzene	0.20	U
99-99-9-----1,3/1,4-Dimethylbenzene	0.50	U
95-47-6-----1,2-Dimethylbenzene	0.20	U
100-42-5-----Styrene	0.25	U
541-73-1-----1,3-Dichlorobenzene	0.20	U
106-46-7-----1,4-Dichlorobenzene	0.23	Z
95-50-1-----1,2-Dichlorobenzene	0.15	U

DRAFT

FORM I 8020

29839 00036 SAMPLE DATA SUMMARY

459

1LCB  
LOW CONC. WATER SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BC1MW1GW5

Lab Name: COMPUCHEM ENV. CORP.

Contract: (10-92) REVS

Lab Code: COMPU

Case No.: 29839

SAS No.:

SDG No.: 00005

Lab Sample ID: 671283

Date Received: 12/20/94

Lab File ID: GH071283A07.D

Date Extracted: 12/21/94

Sample Volume: 1000 (mL)

Date Analyzed: 12/30/94

Concentrated Extract Volume: 1000 (uL)

Dilution Factor: 1.0

Injection Volume: 1.0 (uL)

pH: \_\_\_\_\_

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
---------	----------	-------------------------	---

108-95-2-----	Phenol	5	U
111-44-4-----	bis(2-Chloroethyl) ether	5	U
95-57-8-----	2-Chlorophenol	5	U
95-48-7-----	2-Methylphenol	5	U
108-60-1-----	2,2'-oxybis(1-Chloropropane)	5	U
106-44-5-----	4-Methylphenol	5	U
621-64-7-----	N-Nitroso-di-n-propylamine	5	U
67-72-1-----	Hexachloroethane	5	U
98-95-3-----	Nitrobenzene	5	U
78-59-1-----	Isophorone	5	U
88-75-5-----	2-Nitrophenol	5	U
105-67-9-----	2,4-Dimethylphenol	5	U
111-91-1-----	bis(2-Chloroethoxy) methane	5	U
120-83-2-----	2,4-Dichlorophenol	5	U
120-82-1-----	1,2,4-Trichlorobenzene	5	U
91-20-3-----	Naphthalene	5	U
106-47-8-----	4-Chloroaniline	5	U
87-68-3-----	Hexachlorobutadiene	5	U
59-50-7-----	4-Chloro-3-methylphenol	5	U
91-57-6-----	2-Methylnaphthalene	5	U
77-47-4-----	Hexachlorocyclopentadiene	5	U
88-06-2-----	2,4,6-Trichlorophenol	20	U
95-95-4-----	2,4,5-Trichlorophenol	5	U
91-58-7-----	2-Chloronaphthalene	20	U
88-74-4-----	2-Nitroaniline	5	U
131-11-3-----	Dimethylphthalate	5	U
208-96-8-----	Acenaphthylene	5	U
606-20-2-----	2,6-Dinitrotoluene	20	U
99-09-2-----	3-Nitroaniline	5	U
83-32-9-----	Acenaphthene		

DRAFT

FORM I LCSV-1

10/92

29839 00005 SAMPLE DATA SUMMARY

387

LOW CONC. WATER SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3C1MW1GW5

Lab Name: COMPUCHEM ENV. CORP.

Contract: (10-92)REVS

Lab Code: COMPU

Case No.: 29839

SAS No.:

SDG No.: 00005

Lab Sample ID: 671283

Date Received: 12/20/94

Lab File ID: GH071283A07.D

Date Extracted: 12/21/94

Sample Volume: 1000 (mL)

Date Analyzed: 12/30/94

Concentrated Extract Volume: 1000 (uL)

Dilution Factor: 1.0

Injection Volume: 1.0 (uL)

pH: \_\_\_\_\_

CAS NO. COMPOUND CONCENTRATION (ug/L) Q

51-28-5-----	2,4-Dinitrophenol	20	U
100-02-7-----	4-Nitrophenol	20	U
132-64-9-----	Dibenzofuran	5	U
121-14-2-----	2,4-Dinitrotoluene	5	U
84-66-2-----	Diethylphthalate	5	U
7005-72-3-----	4-Chlorophenyl-phenylether	5	U
86-73-7-----	Fluorene	5	U
100-01-6-----	4-Nitroaniline	20	U
534-52-1-----	4,6-Dinitro-2-methylphenol	20	U
86-30-6-----	N-Nitrosodiphenylamine (1)	5	U
101-55-3-----	4-Bromophenyl-phenylether	5	U
118-74-1-----	Hexachlorobenzene	5	U
87-86-5-----	Pentachlorophenol	20	U
85-01-8-----	Phenanthrene	5	U
120-12-7-----	Anthracene	5	U
84-74-2-----	Di-n-butylphthalate	0.5	J
206-44-0-----	Fluoranthene	5	U
129-00-0-----	Pyrene	5	U
85-68-7-----	Butylbenzylphthalate	5	U
91-94-1-----	3,3'-Dichlorobenzidine	5	U
56-55-3-----	Benzo(a)anthracene	5	U
218-01-9-----	Chrysene	5	U
117-81-7-----	bis(2-Ethylhexyl)phthalate	5	U
117-84-0-----	Di-n-octylphthalate	5	U
205-99-2-----	Benzo(b)fluoranthene	5	U
207-08-9-----	Benzo(k)fluoranthene	5	U
50-32-8-----	Benzo(a)pyrene	5	U
193-39-5-----	Indeno(1,2,3-cd)pyrene	5	U
53-70-3-----	Dibenzo(a,h)anthracene	5	U
191-24-2-----	Benzo(g,h,i)perylene	5	U

(1) - Cannot be separated from Diphenylamine

DRAFT

FORM I LCSV-2

10/92

29839 00005 SAMPLE DATA SUMMARY

386

## U.S. EPA - CLP

1  
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BC1MW1GW5

Lab Name: COMPUCHEM\_ENV.\_CORP. Contract: SW-846

Lab Code: COMPU Case No.: 50063 SAS No.: SDG No.: 298397

Matrix (soil/water): WATER

Lab Sample ID: 671284

Level (low/med): LOW

Date Received: 12/20/94

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	90.8	B		P
7440-36-0	Antimony	1.9	U		P
7440-38-2	Arsenic	2.2	U		F
7440-39-3	Barium	84.0	B		P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	0.50	U		P
7440-70-2	Calcium	112000			P
7440-47-3	Chromium	2.2	U		P
7440-48-4	Cobalt	0.50	U		P
7440-50-8	Copper	3.7	B		P
7439-89-6	Iron	27.2	U		P
7439-92-1	Lead	2.3	B		P
7439-95-4	Magnesium	17100			P
7439-96-5	Manganese	89.0			P
7439-97-6	Mercury	0.20	U	N	CV
7440-02-0	Nickel	1.5	U		P
7440-09-7	Potassium	1880	B		P
7782-49-2	Selenium	4.4	U		P
7440-22-4	Silver	4.5	U		P
7440-23-5	Sodium	27100			P
7440-28-0	Thallium	2.7	U	W	F
7440-62-2	Vanadium	0.54	B		P
7440-66-6	Zinc	0.69	B		P
	Cyanide				NR

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

FORM I - IN

ILM03.0

INORGANIC SDG 298397

8

1D  
HALOGENATED VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

3C1MW3GW5

Lab Name: COMPUCHEM, RTP

Contract:

Lab Code: COMPU Case No.: 29839 SAS No.:

SDG No.: 00003

Matrix: (soil/water) WATER

Lab Sample ID: 671271

Sample wt/vol: 5.0(g/ml)ML

Date Received: 12/20/94

% Moisture: decanted: (Y/N)

Date Analyzed: 12/30/94

Dilution Factor: 1 pH:

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L

Q

CAS NO.

COMPOUND

74-87-3-----	Chloromethane	0.50	U
75-01-4-----	VinylChloride	0.55	U
74-83-9-----	Bromomethane	0.45	U
75-00-3-----	Chloroethane	0.50	U
75-35-4-----	1,1-Dichloroethene	0.35	U
75-09-2-----	Methylene Chloride	1.4	PB
156-60-5-----	t-1,2-Dichloroethene	0.30	U
75-34-3-----	1,1-Dichloroethane	0.35	U
67-66-3-----	Chloroform	0.0040	JPB
74-97-5-----	Bromochloromethane	0.25	U
71-55-6-----	1,1,1-Trichloroethane	0.35	U
56-23-5-----	Carbon Tetrachloride	0.35	U
107-06-2-----	1,2-Dichloroethane	0.25	U
79-01-6-----	Trichloroethene	0.30	U
78-87-5-----	1,2-Dichloropropane	0.30	U
75-27-4-----	Bromodichloromethane	0.40	U
74-95-3-----	Dibromomethane	0.40	U
110-75-8-----	2-CEVE	0.40	U
10061-01-5-----	c-1,3-Dichloropropene	0.30	U
10061-02-6-----	t-1,3-Dichloropropene	0.25	U
79-00-5-----	1,1,2-Trichloroethane	0.25	U
127-18-4-----	Tetrachloroethene	0.30	U
124-48-1-----	Dibromochloromethane	0.30	U
106-93-4-----	1,2-Dibromoethane	0.35	U
108-90-7-----	Chlorobenzene	0.35	U
630-20-6-----	1,1,1,2-Tetrachloroethane	0.35	U
75-25-2-----	Bromoform	0.50	U
79-34-5-----	1,1,2,2-TCA	0.40	U
96-18-4-----	1,2,3-Trichloropropane	0.35	U
108-86-1-----	Bromobenzene	0.85	U
95-49-8-----	2-Chlorotoluene	0.25	U
106-43-4-----	4-Chlorotoluene	0.35	U
541-73-1-----	1,3-Dichlorobenzene	0.20	U
106-46-7-----	1,4-Dichlorobenzene	0.20	U
95-50-1-----	1,2-Dichlorobenzene	0.30	U

DRAFT

29839 00036 SAMPLE DATA SUMMARY



1D  
AROMATIC VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

BC1MW3GW5

Lab Name: COMPUCHEM, RTP

Contract:

Lab Code: COMPU Case No.: 29839 SAS No.: SDG No.: 00003

Matrix: (soil/water) WATER

Lab Sample ID: 671271

Sample wt/vol: 5.0(g/ml)ML

Date Received: 12/20/94

% Moisture: decanted: (Y/N)

Date Analyzed: 12/30/94

Dilution Factor: 1 pH:

CAS NO. COMPOUND CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L Q

74-87-3-----Methyl-t-butyl ether	5.0	U
71-43-2-----Benzene	0.25	J
108-88-3-----Toluene	0.21	J
108-90-7-----Chlorobenzene	0.25	U
100-41-4-----Ethylbenzene	0.20	U
106-42-3-----1,4-Dimethylbenzene	0.13	J
108-38-3-----1,3-Dimethylbenzene	0.13	J
95-47-6-----1,2-Dimethylbenzene	0.20	U
100-42-5-----Styrene	0.25	U
541-73-1-----1,3-Dichlorobenzene	0.20	U
106-46-7-----1,4-Dichlorobenzene	0.35	Z
95-50-1-----1,2-Dichlorobenzene	0.15	U

DRAFT

FORM I 8020

29839 00036 SAMPLE DATA SUMMARY

445

BC1MW3GW5

Lab Name: COMPUCHEM ENV. CORP.

Contract: (10-92)REVS

Lab Code: COMPU

Case No.: 29839

SAS No.:

SDG No.: 00005

Lab Sample ID: 671272

Date Received: 12/20/94

Lab File ID: GH071272A07.D

Date Extracted: 12/21/94

Sample Volume: 1000 (mL)

Date Analyzed: 12/30/94

Concentrated Extract Volume: 1000 (uL)

Dilution Factor: 1.0

Injection Volume: 1.0 (uL)

pH: \_\_\_\_\_

CAS NO. COMPOUND CONCENTRATION (ug/L) Q

108-95-2-----	Phenol	5	U
111-44-4-----	bis(2-Chloroethyl) ether	5	U
95-57-8-----	2-Chlorophenol	5	U
95-48-7-----	2-Methylphenol	5	U
108-60-1-----	2,2'-oxybis(1-Chloropropane)	5	U
106-44-5-----	4-Methylphenol	5	U
621-64-7-----	N-Nitroso-di-n-propylamine	5	U
67-72-1-----	Hexachloroethane	5	U
98-95-3-----	Nitrobenzene	5	U
78-59-1-----	Isophorone	5	U
88-75-5-----	2-Nitrophenol	5	U
105-67-9-----	2,4-Dimethylphenol	5	U
111-91-1-----	bis(2-Chloroethoxy) methane	5	U
120-83-2-----	2,4-Dichlorophenol	5	U
120-82-1-----	1,2,4-Trichlorobenzene	5	U
91-20-3-----	Naphthalene	5	U
106-47-8-----	4-Chloroaniline	5	U
87-68-3-----	Hexachlorobutadiene	5	U
59-50-7-----	4-Chloro-3-methylphenol	5	U
91-57-6-----	2-Methylnaphthalene	5	U
77-47-4-----	Hexachlorocyclopentadiene	5	U
88-06-2-----	2,4,6-Trichlorophenol	20	U
95-95-4-----	2,4,5-Trichlorophenol	5	U
91-58-7-----	2-Chloronaphthalene	20	U
88-74-4-----	2-Nitroaniline	5	U
131-11-3-----	Dimethylphthalate	5	U
208-96-8-----	Acenaphthylene	5	U
606-20-2-----	2,6-Dinitrotoluene	20	U
99-09-2-----	3-Nitroaniline	5	U
83-32-9-----	Acenaphthene		

DRAFT

BC1MW3GW5

Lab Name: COMPUCHEM ENV. CORP.

Contract: (10-92)REVS

Lab Code: COMPU

Case No.: 29839

SAS No.:

SDG No.: 00005

Lab Sample ID: 671272

Date Received: 12/20/94

Lab File ID: GH071272A07.D

Date Extracted: 12/21/94

Sample Volume: 1000 (mL)

Date Analyzed: 12/30/94

Concentrated Extract Volume: 1000 (uL)

Dilution Factor: 1.0

Injection Volume: 1.0 (uL)

pH: \_\_\_\_\_

CAS NO. COMPOUND CONCENTRATION (ug/L) Q

51-28-5-----	2,4-Dinitrophenol	20	U
100-02-7-----	4-Nitrophenol	20	U
132-64-9-----	Dibenzofuran	5	U
121-14-2-----	2,4-Dinitrotoluene	5	U
84-66-2-----	Diethylphthalate	5	U
7005-72-3-----	4-Chlorophenyl-phenylether	5	U
86-73-7-----	Fluorene	5	U
100-01-6-----	4-Nitroaniline	20	U
534-52-1-----	4,6-Dinitro-2-methylphenol	20	U
86-30-6-----	N-Nitrosodiphenylamine (1)	5	U
101-55-3-----	4-Bromophenyl-phenylether	5	U
118-74-1-----	Hexachlorobenzene	5	U
87-86-5-----	Pentachlorophenol	20	U
85-01-8-----	Phenanthrene	5	U
120-12-7-----	Anthracene	5	U
84-74-2-----	Di-n-butylphthalate	5	U
206-44-0-----	Fluoranthene	5	U
129-00-0-----	Pyrene	5	U
85-68-7-----	Butylbenzylphthalate	5	U
91-94-1-----	3,3'-Dichlorobenzidine	5	U
56-55-3-----	Benzo(a)anthracene	5	U
218-01-9-----	Chrysene	5	U
117-81-7-----	bis(2-Ethylhexyl)phthalate	5	U
117-84-0-----	Di-n-octylphthalate	5	U
205-99-2-----	Benzo(b)fluoranthene	5	U
207-08-9-----	Benzo(k)fluoranthene	5	U
50-32-8-----	Benzo(a)pyrene	5	U
193-39-5-----	Indeno(1,2,3-cd)pyrene	5	U
53-70-3-----	Dibenzo(a,h)anthracene	5	U
191-24-2-----	Benzo(g,h,i)perylene	5	U

(1) - Cannot be separated from Diphenylamine

DRAFT

## U.S. EPA - CLP

1  
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BC1MW3GW5

Lab Name: COMPUCHEM\_ENV.\_CORP.\_\_\_\_\_ Contract: SW-846\_\_\_\_\_

Lab Code: COMPU\_ Case No.: 50063\_ SAS No.: \_\_\_\_\_ SDG No.: 298397

Matrix (soil/water): WATER

Lab Sample ID: 671273

Level (low/med): LOW\_

Date Received: 12/20/94

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L\_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	95.1	B		P
7440-36-0	Antimony	1.9	U		P
7440-38-2	Arsenic	2.2	U		F
7440-39-3	Barium	50.2	B		P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	0.50	U		P
7440-70-2	Calcium	72400			P
7440-47-3	Chromium	2.2	U		P
7440-48-4	Cobalt	0.50	U		P
7440-50-8	Copper	4.5	B		P
7439-89-6	Iron	1130			P
7439-92-1	Lead	2.8	B		P
7439-95-4	Magnesium	16300			P
7439-96-5	Manganese	114			P
7439-97-6	Mercury	0.20	U	N	CV
7440-02-0	Nickel	1.5	U		P
7440-09-7	Potassium	1650	B		P
7782-49-2	Selenium	4.4	U		P
7440-22-4	Silver	4.5	U		P
7440-23-5	Sodium	6040			P
7440-28-0	Thallium	2.7	U	W	F
7440-62-2	Vanadium	0.50	U		P
7440-66-6	Zinc	2.3	B		P
	Cyanide				NR

Color Before: COLORLESS

Clarity Before: CLEAR\_

Texture: \_\_\_\_\_

Color After: COLORLESS

Clarity After: CLEAR\_

Artifacts: \_\_\_\_\_

Comments:

FORM I - IN

ILM03.0

INORGANIC SDG 298397

1D  
HALOGENATED VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

BCMW16GW5

Lab Name: COMPUCHEM, RTP

Contract:

Lab Code: COMPU Case No.: 29839 SAS No.:

SDG No.: 00003

Matrix: (soil/water) WATER

Lab Sample ID: 671277

Sample wt/vol: 5.0 (g/ml) ML

Date Received: 12/20/94

% Moisture: decanted: (Y/N)

Date Analyzed: 12/30/94

Dilution Factor: 1 pH:

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L

CAS NO.

COMPOUND

Q

74-87-3-----	Chloromethane	0.50	U
75-01-4-----	Vinyl Chloride	0.55	U
74-83-9-----	Bromomethane	0.45	U
75-00-3-----	Chloroethane	0.50	U
75-35-4-----	1,1-Dichloroethene	0.35	U
75-09-2-----	Methylene Chloride	0.012	JP
156-60-5-----	t-1,2-Dichloroethene	0.30	U
75-34-3-----	1,1-Dichloroethane	0.35	U
67-66-3-----	Chloroform	0.35	U
74-97-5-----	Bromochloromethane	0.25	U
71-55-6-----	1,1,1-Trichloroethane	0.25	JP
56-23-5-----	Carbon Tetrachloride	0.35	U
107-06-2-----	1,2-Dichloroethane	0.25	U
79-01-6-----	Trichloroethene	3.2	
78-87-5-----	1,2-Dichloropropane	0.30	U
75-27-4-----	Bromodichloromethane	0.40	U
74-95-3-----	Dibromomethane	0.40	U
110-75-8-----	2-CEVE	0.40	U
10061-01-5-----	c-1,3-Dichloropropene	0.30	U
10061-02-6-----	t-1,3-Dichloropropene	0.25	U
79-00-5-----	1,1,2-Trichloroethane	0.25	U
127-18-4-----	Tetrachloroethene	4.6	
124-48-1-----	Dibromochloromethane	0.30	U
106-93-4-----	1,2-Dibromoethane	0.35	U
108-90-7-----	Chlorobenzene	0.35	U
630-20-6-----	1,1,1,2-Tetrachloroethane	0.35	U
75-25-2-----	Bromoform	0.50	U
79-34-5-----	1,1,2,2-TCA	0.40	U
96-18-4-----	1,2,3-Trichloropropane	0.35	U
108-86-1-----	Bromobenzene	0.85	U
95-49-8-----	2-Chlorotoluene	0.25	U
106-43-4-----	4-Chlorotoluene	0.35	U
541-73-1-----	1,3-Dichlorobenzene	0.20	U
106-46-7-----	1,4-Dichlorobenzene	0.20	U
95-50-1-----	1,2-Dichlorobenzene	0.30	U

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1D  
AROMATIC VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

3CMW16GW5

Lab Name: COMPUCHEM, RTP

Contract:

Lab Code: COMPU Case No.: 29839 SAS No.: SDG No.: 00003Matrix: (soil/water) WATERLab Sample ID: 671277Sample wt/vol: 5.0(g/ml)MLDate Received: 12/20/94

% Moisture: decanted: (Y/N)

Date Analyzed: 12/30/94Dilution Factor: 1 pH:CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L

CAS NO.

COMPOUND

Q

74-87-3-----Methyl-t-butyl ether	5.0	U
71-43-2-----Benzene	0.35	U
108-88-3-----Toluene	0.25	U
108-90-7-----Chlorobenzene	0.25	U
100-41-4-----Ethylbenzene	0.20	U
99-99-9-----1,3/1,4-Dimethylbenzene	0.50	U
95-47-6-----1,2-Dimethylbenzene	0.20	U
100-42-5-----Styrene	0.25	U
541-73-1-----1,3-Dichlorobenzene	0.20	U
106-46-7-----1,4-Dichlorobenzene	0.15	U
95-50-1-----1,2-Dichlorobenzene	0.15	U

FORM I 8020

29839 00036 SAMPLE DATA SUMMARY

374

LOW CONC. WATER SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

BCMW16GW5

Lab Name: COMPUCHEM ENV. CORP.

Contract: (10-92)REVS

Lab Code: COMPU

Case No.: 29839

SAS No.:

SDG No.: 00005

Lab Sample ID: 671278

Date Received: 12/20/94

Lab File ID: G2J71278A07.D

Date Extracted: 12/21/94

Sample Volume: 1000 (mL)

Date Analyzed: 01/13/95

Concentrated Extract Volume: 1000 (uL)

Dilution Factor: 1.0

Injection Volume: 1.0 (uL)

pH: \_\_\_\_\_

CAS NO. COMPOUND CONCENTRATION (ug/L) Q

108-95-2-----	Phenol	5	U
111-44-4-----	bis (2-Chloroethyl) ether	5	U
95-57-8-----	2-Chlorophenol	5	U
95-48-7-----	2-Methylphenol	5	U
108-60-1-----	2,2'-oxybis (1-Chloropropane)	5	U
106-44-5-----	4-Methylphenol	5	U
621-64-7-----	N-Nitroso-di-n-propylamine	5	U
67-72-1-----	Hexachloroethane	5	U
98-95-3-----	Nitrobenzene	5	U
78-59-1-----	Isophorone	5	U
88-75-5-----	2-Nitrophenol	5	U
105-67-9-----	2,4-Dimethylphenol	5	U
111-91-1-----	bis (2-Chloroethoxy) methane	5	U
120-83-2-----	2,4-Dichlorophenol	5	U
120-82-1-----	1,2,4-Trichlorobenzene	5	U
91-20-3-----	Naphthalene	5	U
106-47-8-----	4-Chloroaniline	5	U
87-68-3-----	Hexachlorobutadiene	5	U
59-50-7-----	4-Chloro-3-methylphenol	5	U
91-57-6-----	2-Methylnaphthalene	5	U
77-47-4-----	Hexachlorocyclopentadiene	5	U
88-06-2-----	2,4,6-Trichlorophenol	20	U
95-95-4-----	2,4,5-Trichlorophenol	5	U
91-58-7-----	2-Chloronaphthalene	20	U
88-74-4-----	2-Nitroaniline	5	U
131-11-3-----	Dimethylphthalate	5	U
208-96-8-----	Acenaphthylene	5	U
606-20-2-----	2,6-Dinitrotoluene	20	U
99-09-2-----	3-Nitroaniline	5	U
83-32-9-----	Acenaphthene		

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FORM I LCSV-1

10/92

29839 00005 SAMPLE DATA SUMMARY

372

LOW CONC. WATER SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BCMW16GWS

Lab Name: COMPUCHEM ENV. CORP.

Contract: (10-92)REVS

Lab Code: COMPU

Case No.: 29839

SAS No.:

SDG No.: 00005

Lab Sample ID: 671278

Date Received: 12/20/94

Lab File ID: G2J71278A07.D

Date Extracted: 12/21/94

Sample Volume: 1000 (mL)

Date Analyzed: 01/13/95

Concentrated Extract Volume: 1000 (uL)

Dilution Factor: 1.0

Injection Volume: 1.0 (uL)

pH: \_\_\_\_\_

CAS NO. COMPOUND CONCENTRATION (ug/L) Q

51-28-5	2,4-Dinitrophenol	20	U
100-02-7	4-Nitrophenol	20	U
132-64-9	Dibenzofuran	5	U
121-14-2	2,4-Dinitrotoluene	5	U
84-66-2	Diethylphthalate	5	U
7005-72-3	4-Chlorophenyl-phenylether	5	U
86-73-7	Fluorene	5	U
100-01-6	4-Nitroaniline	20	U
534-52-1	4,6-Dinitro-2-methylphenol	20	U
86-30-6	N-Nitrosodiphenylamine (1)	5	U
101-55-3	4-Bromophenyl-phenylether	5	U
118-74-1	Hexachlorobenzene	5	U
87-86-5	Pentachlorophenol	20	U
85-01-8	Phenanthrene	5	U
120-12-7	Anthracene	5	U
84-74-2	Di-n-butylphthalate	5	U
206-44-0	Fluoranthene	5	U
129-00-0	Pyrene	5	U
85-68-7	Butylbenzylphthalate	5	U
91-94-1	3,3'-Dichlorobenzidine	5	U
56-55-3	Benzo(a)anthracene	5	U
218-01-9	Chrysene	5	U
117-81-7	bis(2-Ethylhexyl)phthalate	5	U
117-84-0	Di-n-octylphthalate	5	U
205-99-2	Benzo(b)fluoranthene	5	U
207-08-9	Benzo(k)fluoranthene	5	U
50-32-8	Benzo(a)pyrene	5	U
193-39-5	Indeno(1,2,3-cd)pyrene	5	U
53-70-3	Dibenzo(a,h)anthracene	5	U
191-24-2	Benzo(g,h,i)perylene	5	U

(1) - Cannot be separated from Diphenylamine

DRAFT

FORM I LCSV-2

10/92

29839 00005 SAMPLE DATA SUMMARY

371



1  
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BCMW16GW5

Lab Name: COMPUCHEM\_ENV.\_CORP.\_\_\_\_\_ Contract: SW-846\_\_\_\_\_

Lab Code: COMPU\_\_\_\_\_ Case No.: 50063\_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: 298397

Matrix (soil/water): WATER

Lab Sample ID: 671279

Level (low/med): LOW\_\_\_\_\_

Date Received: 12/20/94

% Solids: \_\_\_\_\_0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L\_\_\_\_\_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	91.0	B		P
7440-36-0	Antimony	1.9	U		P
7440-38-2	Arsenic	2.2	U		F
7440-39-3	Barium	39.3	B		P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	0.50	U		P
7440-70-2	Calcium	93400			P
7440-47-3	Chromium	2.2	U		P
7440-48-4	Cobalt	0.50	U		P
7440-50-8	Copper	3.7	B		P
7439-89-6	Iron	27.2	U		P
7439-92-1	Lead	1.6	U		P
7439-95-4	Magnesium	18600			P
7439-96-5	Manganese	4.8	B		P
7439-97-6	Mercury	0.20	U	N	CV
7440-02-0	Nickel	1.5	U		P
7440-09-7	Potassium	1650	B		P
7782-49-2	Selenium	4.4	U		P
7440-22-4	Silver	4.5	U		P
7440-23-5	Sodium	21600			P
7440-28-0	Thallium	2.7	U	W	F
7440-62-2	Vanadium	0.50	U		P
7440-66-6	Zinc	3.5	B		P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR\_\_\_\_\_ Texture: \_\_\_\_\_

Color After: COLORLESS Clarity After: CLEAR\_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:



DRAFT

LABORATORY TESTS RESULTS  
01/10/95

JOB NUMBER: 114420

CUSTOMER: Earth Tech

ATTN: Carol Smith

CLIENT I.D.: Sample ID: 1GW14 (106573)  
 DATE SAMPLED: 12/15/94  
 TIME SAMPLED: 14:55  
 WORK DESCRIPTION: Project ID: 110FG, MIANG

LABORATORY I.D.: 114420-0005  
 DATE RECEIVED: 12/27/94  
 TIME RECEIVED: 15:00  
 REMARKS: Water

BCITmw3  
 40'-42'

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics in Water		*1		USEPA 8260	12/29/94	RDC
Dichlorodifluoromethane	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Trichlorofluoromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
Methylene chloride	1.2	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
2,2-Dichloropropane	ND	1.0	ug/l			
cis-1,2-Dichloroethene	ND	1.0	ug/l			
Chloroform	ND	1.0	ug/l			
Bromochloromethane	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
1,1-Dichloropropene	ND	1.0	ug/l			
Benzene	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Dibromomethane	ND	1.0	ug/l			
Toluene	5.2	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Tetrachloroethene	5.6	1.0	ug/l			
1,3-Dichloropropane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,2-Dibromoethane	ND	1.0	ug/l			
1-Chlorohexane	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
1,1,1,2-Tetrachloroethane	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
Styrene	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Isopropylbenzene	ND	1.0	ug/l			
1,1,2,2-Tetrachloroethane	ND	1.0	ug/l			
Bromobenzene	ND	1.0	ug/l			
1,2,3-Trichloropropane	ND	1.0	ug/l			
N-propylbenzene	ND	1.0	ug/l			
2-Chlorotoluene	ND	1.0	ug/l			
1,3,5-Trimethylbenzene	ND	1.0	ug/l			
4-Chlorotoluene	ND	1.0	ug/l			

12649 Richfield Court  
 Livonia, MI 48150  
 (313) 462-3900

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LABORATORY TESTS RESULTS  
01/10/95

JOB NUMBER: 114420

CUSTOMER: Earth Tech

ATTN: Carol Smith

CLIENT I.D.: Sample ID: 1GW14 (106573)

LABORATORY I.D.: 114420-0005

DATE SAMPLED: 12/15/94

DATE RECEIVED: 12/27/94

TIME SAMPLED: 14:55

TIME RECEIVED: 15:00

WORK DESCRIPTION: Project ID: 110FG, MIANG

REMARKS: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
t-butylbenzene	ND	1.0	ug/l			
1,2,4-Trimethylbenzene	ND	1.0	ug/l			
s-butylbenzene	ND	1.0	ug/l			
p-isopropyltoluene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
n-butylbenzene	ND	1.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,2-Dibromo-3-chloropropane	ND	1.0	ug/l			
1,2,4-Trichlorobenzene	ND	1.0	ug/l			
Hexachlorobutadiene	ND	1.0	ug/l			
Naphthalene	ND	1.0	ug/l			
1,2,3-Trichlorobenzene	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	102	0	%	86-115 %		
1,2-Dichloroethane-d4	98	0	%	70-121 %		
Toluene-d8	100	0	%	88-110 %		
Date Analyzed:	12/29/94	0	Month/Day/Year			

12649 Richfield Court  
Livonia, MI 48150  
(313) 462-3900



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LABORATORY TESTS RESULTS  
01/10/95

LAB NUMBER: 114420

CUSTOMER: Earth Tech

ATTN: Carol Smith

CLIENT I.D.: Sample ID: BCITMW3 (106570) 25' - 32'  
 DATE SAMPLED: 12/15/94  
 TIME SAMPLED: 15:55  
 WORK DESCRIPTION: Project ID: 110FG, MIANG

LABORATORY I.D.: 114420-0002  
 DATE RECEIVED: 12/27/94  
 TIME RECEIVED: 15:00  
 REMARKS: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics in Water		*1		USEPA 8260	12/29/94	RDC
Dichlorodifluoromethane	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Trichlorofluoromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
Methylene chloride	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
2,2-Dichloropropane	ND	1.0	ug/l			
cis-1,2-Dichloroethene	ND	1.0	ug/l			
Chloroform	ND	1.0	ug/l			
Bromochloromethane	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
1,1-Dichloropropene	ND	1.0	ug/l			
Benzene	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Dibromomethane	ND	1.0	ug/l			
Toluene	2.6	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Tetrachloroethene	2.4	1.0	ug/l			
1,3-Dichloropropane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,2-Dibromoethane	ND	1.0	ug/l			
1-Chlorohexane	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
1,1,1,2-Tetrachloroethane	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
Styrene	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Isopropylbenzene	ND	1.0	ug/l			
1,1,2,2-Tetrachloroethane	ND	1.0	ug/l			
Bromobenzene	ND	1.0	ug/l			
1,2,3-Trichloropropane	ND	1.0	ug/l			
N-propylbenzene	ND	1.0	ug/l			
2-Chlorotoluene	ND	1.0	ug/l			
1,3,5-Trimethylbenzene	ND	1.0	ug/l			
4-Chlorotoluene	ND	1.0	ug/l			

12649 Richfield Court  
 Livonia, MI 48150  
 (313) 462-3900



DRAFT

LABORATORY TESTS RESULTS  
01/10/95

LABORATORY NUMBER: 114420 CUSTOMER: Earth Tech ATTN: Carol Smith

CLIENT I.D.: Sample ID: 8CITMW3 (106570)  
DATE SAMPLED: 12/15/94  
TIME SAMPLED: 15:55  
WORK DESCRIPTION: Project ID: 110FG, MIANGLABORATORY I.D.: 114420-0002  
DATE RECEIVED: 12/27/94  
TIME RECEIVED: 15:00  
REMARKS: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
n-butylbenzene	ND	1.0	ug/l			
1,2,4-Trimethylbenzene	ND	1.0	ug/l			
n-butylbenzene	ND	1.0	ug/l			
p-isopropyltoluene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
n-butylbenzene	ND	1.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,2-Dibromo-3-chloropropane	ND	1.0	ug/l			
1,2,4-Trichlorobenzene	ND	1.0	ug/l			
hexachlorobutadiene	ND	1.0	ug/l			
naphthalene	ND	1.0	ug/l			
1,2,3-Trichlorobenzene	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
monofluorobenzene	102	0	%	86-115 %		
1,2-Dichloroethane-d4	100	0	%	70-121 %		
Toluene-d8	100	0	%	88-110 %		
Date Analyzed:	12/29/94	0	Month/Day/Year			

12649 Richfield Court  
Livonia, MI 48150  
(313) 462-3900

PROJECT SPECIFIC FRACTION  
USEPA 8270

EARTH TECH - OAK RIDGE  
Proj: 110th Fighter Group  
MICH A.N.G.  
Subm: 15-December-1994 Sampling  
Sample: BC1TMW3

Submittal Number 32429- 9  
Date Sampled: 12/15/94 Time: 15:55  
Date Received: 12/20/94 Time: 10:30  
Analysis Date: 01/06/95  
Lab Sample No: 106565

Parameter	Result ug/l	Reporting Limit ug/l
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Bis (2-Chloroethoxy) - Methane	<5.0	5.0
Bis (2-Chloroethyl) Ether	<5.0	5.0
Bis (2-Chloroisopropyl) - Ether	<5.0	5.0
Bis (2-ethylhexyl) - Phthalate	<5.0	5.0
4-Bromophenyl Phenylether	<5.0	5.0
Butyl Benzyl Phthalate	<5.0	5.0
4-Chloro-3-Methylphenol	<5.0	5.0
4-Chloroaniline	<20	20
2-Chloronaphthalene	<5.0	5.0
2-Chlorophenol	<5.0	5.0
4-Chlorophenylphenyl- Ether	<5.0	5.0
Chrysene	<5.0	5.0
Di-n-Butylphthalate	<5.0	5.0
Di-n-Octylphthalate	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Dibenzofuran	<5.0	5.0
3,3'-Dichlorobenzidine	<20	20
2,4-Dichlorophenol	<5.0	5.0
Diethylphthalate	<5.0	5.0
Dimethylphthalate	<5.0	5.0
2,4-Dimethylphenol	<5.0	5.0
4,6-Dinitro- 2-Methylphenol	<20	20
2,4-Dinitrophenol	<20	20

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PROJECT SPECIFIC FRACTION  
USEPA 8270

EARTH TECH - OAK RIDGE  
Proj: 110th Fighter Group  
MICH A.N.G.  
Subm: 15-December-1994 Sampling  
Sample: BC1TMW3

Submittal Number 32429- 9  
Date Sampled: 12/15/94 Time: 15:55  
Date Received: 12/20/94 Time: 10:30  
Analysis Date: 01/06/95  
Lab Sample No: 106565

Parameter	Result	Reporting Limit
	ug/l	ug/l
2,4-Dinitrotoluene	<5.0	5.0
2,6-Dinitrotoluene	<5.0	5.0
Fluoranthene	<5.0	5.0
Fluorene	<5.0	5.0
Hexachlorobenzene	<5.0	5.0
Hexachlorobutadiene	<5.0	5.0
Hexachlorocyclopentadiene	<5.0	5.0
Hexachloroethane	<5.0	5.0
Indeno (1,2,3-cd) Pyrene	<5.0	5.0
Isophorone	<5.0	5.0
2-Methylnaphthalene	<5.0	5.0
2-Methylphenol	<5.0	5.0
4-Methylphenol	<5.0	5.0
N-Nitrosodi-n-Propylamine	<5.0	5.0
N-Nitroso-di-Phenylamine	<5.0	5.0
Naphthalene	<5.0	5.0
2-Nitroaniline	<20	20
3-Nitroaniline	<20	20
4-Nitroaniline	<20	20
Nitrobenzene	<5.0	5.0
2-Nitrophenol	<5.0	5.0
4-Nitrophenol	<20	20
Pentachlorophenol	<20	20
Phenanthrene	<5.0	5.0
Phenol	<5.0	5.0
Pyrene	<5.0	5.0
1,2,4-Trichlorobenzene	<5.0	5.0
2,4,5-Trichlorophenol	<50	50
2,4,6-Trichlorophenol	<5.0	5.0
1-Methylnaphthalene	<5.0	5.0

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PROJECT SPECIFIC FRACTION  
USEPA 8270

EARTH TECH - OAK RIDGE  
Proj: 110th Fighter Group  
MICH A.N.G.  
Subm: 15-December-1994 Sampling  
Sample: 1GW14

Submittal Number 32429- 9  
Date Sampled: 12/15/94 Time: 14:55  
Date Received: 12/20/94 Time: 10:30  
Analysis Date: 01/06/95  
Lab Sample No: 106562

BCITMW3  
46-42'

Parameter	Result ug/l	Reporting Limit ug/l
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Bis (2-Chloroethoxy) - Methane	<5.0	5.0
Bis (2-Chloroethyl) Ether	<5.0	5.0
Bis (2-Chloroisopropyl) - Ether	<5.0	5.0
Bis (2-ethylhexyl) - Phthalate	<5.0	5.0
4-Bromophenyl Phenylether	<5.0	5.0
Butyl Benzyl Phthalate	<5.0	5.0
4-Chloro-3-Methylphenol	<5.0	5.0
4-Chloroaniline	<20	20
2-Chloronaphthalene	<5.0	5.0
2-Chlorophenol	<5.0	5.0
4-Chlorophenylphenyl- Ether	<5.0	5.0
Chrysene	<5.0	5.0
Di-n-Butylphthalate	<5.0	5.0
Di-n-Octylphthalate	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Dibenzofuran	<5.0	5.0
3,3'-Dichlorobenzidine	<20	20
2,4-Dichlorophenol	<5.0	5.0
Diethylphthalate	<5.0	5.0
Dimethylphthalate	<5.0	5.0
2,4-Dimethylphenol	<5.0	5.0
4,6-Dinitro- 2-Methylphenol	<20	20
2,4-Dinitrophenol	<20	20

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PROJECT SPECIFIC FRACTION  
USEPA 8270

EARTH TECH - OAK RIDGE  
Proj: 110th Fighter Group  
MICH A.N.G.  
Subm: 15-December-1994 Sampling  
Sample: 1GW14

Submittal Number 32429- 9  
Date Sampled: 12/15/94 Time: 14:55  
Date Received: 12/20/94 Time: 10:30  
Analysis Date: 01/06/95  
Lab Sample No: 106562

← BC17mW3  
40-42'

Parameter	Result	Reporting Limit
	ug/l	ug/l
2,4-Dinitrotoluene	<5.0	5.0
2,6-Dinitrotoluene	<5.0	5.0
Fluoranthene	<5.0	5.0
Fluorene	<5.0	5.0
Hexachlorobenzene	<5.0	5.0
Hexachlorobutadiene	<5.0	5.0
Hexachlorocyclopentadiene	<5.0	5.0
Hexachloroethane	<5.0	5.0
Indeno (1,2,3-cd) Pyrene	<5.0	5.0
Isophorone	<5.0	5.0
2-Methylnaphthalene	<5.0	5.0
2-Methylphenol	<5.0	5.0
4-Methylphenol	<5.0	5.0
N-Nitrosodi-n-Propylamine	<5.0	5.0
N-Nitroso-di-Phenylamine	<5.0	5.0
Naphthalene	<5.0	5.0
2-Nitroaniline	<20	20
3-Nitroaniline	<20	20
4-Nitroaniline	<20	20
Nitrobenzene	<5.0	5.0
2-Nitrophenol	<5.0	5.0
4-Nitrophenol	<20	20
Pentachlorophenol	<20	20
Phenanthrene	<5.0	5.0
Phenol	<5.0	5.0
Pyrene	<5.0	5.0
1,2,4-Trichlorobenzene	<5.0	5.0
2,4,5-Trichlorophenol	<50	50
2,4,6-Trichlorophenol	<5.0	5.0
1-Methylnaphthalene	<5.0	5.0

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**APPENDIX L: GUIDANCE DOCUMENTS FROM THE  
MDNR**

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

June 5, 1995

TO: Environmental Response Division Staff

FROM: Alan J. Howard, Chief, Environmental Response Division

SUBJECT: Interim Environmental Response Division Operational Memorandum #8,  
Revision 4: Generic Residential Cleanup Criteria

THIS DRAFT, INTERIM OPERATIONAL MEMORANDUM HAS BEEN PREPARED TO FACILITATE IMPLEMENTATION OF THE 1995 AMENDMENTS TO PART 201 OF THE NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION ACT, 1994 PA 451 (FORMERLY THE MICHIGAN ENVIRONMENTAL RESPONSE ACT). THIS OPERATIONAL MEMORANDUM WILL TAKE EFFECT ONLY WHEN HOUSE BILL 4596 IS SIGNED INTO LAW. INTERNAL REVIEW OF THIS MEMORANDUM IS ON-GOING, AND NO OUTSIDE REVIEW HAS BEEN COMPLETED. THE CONTENT OF THE MEMORANDUM, AND THE ATTACHED CRITERIA, ARE SUBJECT TO CHANGE AND SHOULD BE RELIED UPON ONLY AFTER CONFIRMATION WITH APPROPRIATE ERD STAFF.

Revision 4 of this Operational Memorandum reflects changes made as a result of two major legislative actions: (1) the incorporation of the Michigan Environmental Response Act (MERA), 1982 PA 307, as amended, (2) into the Natural Resources and Environmental Protection Code, 1994 PA 451; and the 1995 amendments to Part 201 contained in [House Bill 4596]. Enactment of the Natural Resources and Environmental Protection Act resulted in new section numbers for all of the former MERA, but did not make any substantive changes in the law. [House Bill 4596] substantially amends Part 201. Those amendments, particularly the changes in cleanup standards, are reflected in this revision of Operational Memorandum #8. Unless otherwise noted, Section references in this memorandum are to Part 201 of Act 451.

The attached table lists generic residential cleanup criteria which have been developed pursuant to Sections 20120A(1)(A) and (3), according to the updated algorithms presented in this memo. This table replaces the previously issued list of Type B criteria dated February 4, 1994. The label of "Type B" has been eliminated and the criteria are now referred to as generic residential criteria. The algorithms as presented in the administrative rules of the Michigan Environmental Response Act, 1982 Public Act 307, as amended, have been replaced by updated algorithms which represent current U.S. Environmental Protection Agency (EPA) guidance and a format consistent with the industrial/commercial equations and those used by the Underground Storage Tank Division (USTD).

The criteria were developed using currently available toxicological data, exposure data, and other data and are subject to change as new data become

available. These criteria are presented in two significant figures; reference doses and slope factors used to generate the criteria were also reported in two significant figures. Cleanup criteria from the attached table should be compared to analytical data presented in two significant figures, as well.

This list presents noncarcinogens and carcinogens together; carcinogens are presented in bold and italics. Chemicals beginning with numbers (such as 1,1,2-trichloroethane) are incorporated alphabetically within the list. Criteria on these lists should be considered draft; final cleanup criteria will be confirmed by Environmental Response Division (ERD) toxicologists and approved as part of a specific remedial action plan (RAP). Staff are reminded that generic residential RAPs must address all elements required by Part 201 and the administrative rules, including those for which specific criteria have not been developed. Additional guidance follows.

Note that in cases where generic residential criteria are less than target method detection limits (MDLs) or background, target MDLs or background levels become the cleanup goal. Generic residential criteria are not relevant in these cases.

The table presents values for the subrules that are most often expected to be the controlling factor in determining soil cleanup criteria. However, a generic residential RAP must include rationale that supports the conclusions drawn from the assessment of pertinent pathways (i.e., some discussion of each pertinent pathway must be included which assesses whether more restrictive criteria are required; See R 299.5711(1) and R 299.5711(6).

#### **HEALTH-BASED AND AESTHETIC DRINKING WATER VALUES**

The values in the first column of the table were developed using the residential groundwater algorithms presented later in this memo for carcinogens and noncarcinogens. The values in the second column of the table were established, where sufficient data are available, to protect against adverse aesthetic impacts of hazardous substances on groundwater.

The most restrictive of the values in the first two columns of the table is the cleanup criterion required to satisfy Section 20120A(4) of Part 201. However, where a State Drinking Water Standard has been established, that standard will override the health-based drinking water criteria, as indicated in Sec. 20120A(5) of Part 201. A more restrictive aesthetic criterion will take precedence over the State Drinking Water Standard. Note that Rule 299.5709, referenced in Section 20120A(5), requires that aquifer cleanup criteria take into account adverse aesthetic impacts resulting from one or a combination of hazardous substances. If adverse aesthetic impacts remain when health-based criteria have been achieved, further remedial measures may be required. Consult your Supervisor if you encounter such a case.

#### **IMPACTS OF GROUNDWATER CONTAMINANTS ON SURFACE WATER**

The third column in the table lists values based on calculations done by Surface Water Quality Division (SWQD) in accordance with Rule 323.1057 of Part 4 of Part 31 of the Natural Resources and Environmental Protection Act, 1994 PA 451 (formerly known as the Water Resources Commission Act, 1929, PA 245, as amended) or on the National Toxics Rule (NTR; Federal Register, December 22, 1992. Vol. 57(246):60848-60923). For use in ERD programs, the criterion which protects surface water has been termed the groundwater surface water interface (GSI) value. The final GSI value is the more restrictive of the Rule 57 value and the NTR value, where both are available (with the exception of arsenic whose GSI value is the Rule 57 value even though it is greater than the NTR value). Where only one of the two values is available, that number becomes the GSI value.

The GSI values are the criteria used to judge compliance with Rule 299.5713. GSI values are developed for surface water which is not used as a drinking water source and also for surface water which serves as a source of drinking water. GSI values presented in the list are for surface waters not protected as a drinking water source. If the surface water at a site serves as a drinking water source, contact an ERD toxicologist to obtain the correct GSI value. In cases where data are inadequate to calculate a GSI value, the party proposing the remedial action may generate the minimum data necessary to propose a value for Department review and approval.

Prior to passage of the 1995 amendments, a mixing zone was not allowed when assessing the impact of groundwater venting to a surface water. A mixing zone is now allowed for venting groundwater at those sites where an additional load to the receiving stream of site-specific contaminants is allowable and where a mixing zone is appropriate for the receiving stream. If a RAP allows for venting groundwater, the discharge must comply with requirements of Part 31 of Act 451 and the relevant rules promulgated under that Part.

Demonstration of compliance with surface water requirements may be made by assessing groundwater concentrations at the groundwater-surface water interface or through evaluation of mixing zone, whichever is appropriate for a particular site. Predictive modeling and direct monitoring are options to establish compliance with the GSI value at the groundwater-surface water interface. If the groundwater-surface water interface is the compliance point for a particular site, it is not necessary that the GSI value be achieved throughout the aquifer. However, a remedial action plan which proposes to meet the GSI value throughout the aquifer in lieu of monitoring at the interface or modeling will be acceptable.

Note that the sixth column on the table will show 20 times the GSI values. This value is shown for ease of reference in cases where soil is to be remediated to that level as a source control measure. Rule 299.5711 does not require that soil meet the "20 times GSI values", as long as the GSI value is not exceeded at the appropriate compliance point.

#### SOIL CRITERIA PROTECTIVE OF GROUNDWATER

The "20X" values in the table are provided for convenience and are not mandatory if leachate tests or other methods which better represent in situ conditions support the use of a higher value (refer to Operational Memo #12 for guidance on appropriate leachate methods). For certain chemicals which strongly adsorb to soil and are known not to leach at significant concentrations (i.e., PCBs, carcinogenic polynuclear aromatic hydrocarbons and some chlorinated pesticides), the direct contact value is accepted as the soil cleanup criterion to protect groundwater in addition to the protection against long-term, systemic direct contact hazards. However, there are certain situations (i.e., presence of solvents or collection of unfiltered groundwater samples) which could result in the presence of these types of materials in groundwater. These other conditions should be evaluated before a chemical is considered nonmobile in soil. Consult an ERD toxicologist if you think direct contact values for other contaminants would be protective of groundwater or if you have questions about conditions that could cause the transport of a nonmobile contaminant through soil.

#### SOIL DIRECT CONTACT CRITERIA

Direct contact criteria only consider long-term, systemic exposure from ingestion of and dermal contact with contaminated soil. Consequently, there

are other potential concerns that may need to be addressed (see discussion of issues not addressed by the direct contact criteria presented below).

Compliance with direct contact criteria are required throughout the affected media in the unlimited residential land use category, but exposure controls and land use restrictions may be employed to prevent exposures to more highly contaminated soils at depth under the limited residential land use category.

Average on-site soil concentrations, represented as a 95% upper confidence level (UCL) on the arithmetic mean, may be used to determine compliance with the soil direct contact value. On-site 95% UCLs should, however, reasonably represent the areas over which exposures are expected to occur. Typically, the exposure area for a residential property is approximately one-quarter acre in size. Refer to EPA guidance on how to appropriately calculate the 95% UCL (EPA, 1992a).

#### Issues Not Addressed by the Direct Contact Criteria

**Inhalation:** All RAPs must document that they are protective of the public health, safety and welfare and the environment. As a result, they must contain some discussion of potential inhalation risks, and whether inhalation (i.e. exposure through volatile or particulate contaminant emissions) is a pertinent pathway for human exposure at the site in question. The direct contact criteria do not address and are not applicable for the inhalation pathway because they do not incorporate potential inhalation effects, long-term or acute, of hazardous substances in soil.

Chemical characteristics which are pertinent to this discussion include vapor pressure and/or Henry's Law constant, the potential to cause cancer via the inhalation route, the potential to cause irritation of respiratory tissue and special characteristics which may make a contaminant an inhalation hazard (e.g., friable asbestos). The RAP should indicate whether any materials with these characteristics are present. If such materials are present, it may be necessary to conduct a risk assessment of the inhalation pathway to determine if lower cleanup criteria are required for protection of human health. Consult an ERD toxicologist for guidance. If no significant inhalation risk exists, criteria and/or exposure control measures which are protective for other routes of exposure will be deemed protective for the inhalation pathway and a narrative assessment for the inhalation pathway will be sufficient.

**Dermal Toxicity:** The direct contact soil equation does not address acute skin toxicity or skin sensitization. These concerns may have to be addressed before chemicals with skin toxicity or sensitization characteristics can be left in place at the direct contact value. Contact an ERD toxicologist for guidance.

**Ecological Concerns:** RAPs must also address ecological concerns. The RAP should include a description of the physical setting of the site, including any natural resources which could be affected by the release(s) addressed in the plan. In general, potential ecological impacts are defined as adverse impacts on a community or a population of organisms rather than on an individual who is the focus of a human health risk assessment. An ecological risk assessment will be required only if there is a "sensitive environmental resource" present at or near the site, or if there are other special circumstances such as concern for persistent or bioaccumulative hazardous substances, which may adversely effect the food chain, or a physical feature that would attract wildlife to the site (e.g., migratory waterfowl habitat).

Professional judgment must be used to determine whether it is likely that criteria more restrictive than those required to protect public health, or those required pursuant to other applicable regulations (e.g., groundwater/surface water interface criteria), are necessary to protect natural resources at or near the site. If ERD staff believe that there is a need for an ecological assessment, this should be reviewed with your supervisor and other technical experts as appropriate. Ecological risk assessments will be the exception rather than the rule.

#### TARGET METHOD DETECTION LIMITS

The table also includes the target method detection limits (MDLs) for each hazardous substance, where one has been determined. These target MDLs are taken from Operational Memorandum #6, revision 4 and are provided to allow for convenient comparison between generic residential criteria and target MDLs. Consult Operational Memorandum #6 for a full description of the use of target MDLs and proper methods for analysis.

The use of particular methods and detection limits listed in Operational Memorandum #6 are not mandatory. Other methods or detection limits may be approved as part of a site-specific RAP.

These target MDLs are applicable to environmental investigations and monitoring performed pursuant to Part 201 response activities. These detection limits may not be applicable to environmental monitoring activities performed pursuant to other Parts of Act 451 or environmental statutes. Facilities subject to regulation under other environmental statutes should consult with the appropriate DNR Division for further information regarding appropriate analytical detection limits.

#### GENERIC RESIDENTIAL ALGORITHMS

##### RESIDENTIAL GROUNDWATER ALGORITHMS:

##### CARCINOGENS:

$$C_{dw} = \frac{10^{-5} \times BW \times AT \times CF}{SF \times EF \times ED \times IR_{dw}}$$

where,	$C_{dw}$ (risk-based drinking water concentration)	= in ug/l (ppb)
	$10^{-5}$ cancer risk	= acceptable risk
	BW (body weight)	= 70 kg
	AT (averaging time in days)	= 25,550 days (70 x 365)
	CF (conversion factor)	= 1000 ug/mg
	SF (cancer slope factor, mg/kg-d <sup>-1</sup> )	= chemical-specific
	EF (exposure frequency)	= 350 d/yr
	ED (exposure duration)	= 30 yr
	$IR_{dw}$ (drinking water ingestion rate)	= 2 liter/day

NONCARCINOGENS:

$$C_{dw} = \frac{HQ \times RfD \times BW \times AT \times RSC \times CF}{EF \times ED \times IR_{dw}}$$

where,  $C_{dw}$  (risk-based drinking water concentration) = in ug/l (ppb)  
 HQ (hazard quotient) = 1  
 RfD (oral reference dose, mg/kg/d) = chemical-specific  
 BW (body weight) = 70 kg  
 AT (averaging time) = 10,950 days (30 x 365)  
 RSC (relative source contribution) = 0.2  
 CF (conversion factor) = 1000 ug/mg  
 EF (exposure frequency) = 350 d/yr  
 ED (exposure duration) = 30 yr  
 $IR_{dw}$  (drinking water ingestion rate) = 2 liter/day

RESIDENTIAL DIRECT CONTACT SOIL CRITERION ALGORITHMS:

CARCINOGENS:

$$C_s = \frac{10^{-5} \times AT \times CF}{SF \times FC \times [(EF_i \times IF \times AE_i) + (EF_d \times DF \times AE_d)]}$$

where,  $C_s$  (risk-based soil concentration) = ug/kg (ppb)  
 $10^{-5}$  cancer risk = acceptable risk  
 AT (averaging time) = 25,550 days (70 x 365)  
 CF (conversion factor) =  $1E+9$  ug/kg  
 SF (cancer slope factor, mg/kg-d<sup>-1</sup>) = chemical-specific  
 FC (fraction of soil contaminated) = 1  
 $EF_i$  (ingestion exposure frequency) = 350 d/yr  
 $EF_d$  (dermal exposure frequency) = 245 d/yr  
 IF (age-adjusted soil ingestion factor) = 114 mg-yr/kg-d\*  
 $AE_i$  (ingestion absorption efficiency) = (see text)  
 DF (age-adjusted soil dermal factor) = 2442 mg-yr/kg-d\*\*  
 $AE_d$  (dermal absorption efficiency) = (see text)

NONCARCINOGENS:

$$\frac{HQ \times RfD \times AT \times CF}{FC \times [(EF_i \times IF \times AE_i) + (EF_d \times DF \times AE_d)]}$$

where,  $C_s$  (risk-based soil concentration) = ug/kg (ppb)  
 HQ (hazard quotient) = 1  
 RfD (oral reference dose, mg/kg/d) = chemical-specific  
 AT (averaging time) = 10,950 days (30 x 365)  
 CF (conversion factor) =  $1E+9$  ug/kg  
 FC (fraction soil contaminated) = 1  
 $EF_i$  (ingestion exposure frequency) = 350 d/yr  
 $EF_d$  (dermal exposure frequency) = 245 d/yr  
 IF (age-adjusted soil ingestion factor) = 114 mg-yr/kg-d\*  
 $AE_i$  (ingestion absorption efficiency) = (see text)  
 DF (age-adjusted soil dermal factor) = 2442 mg-yr/kg-d\*\*  
 $AE_d$  (dermal absorption efficiency) = (see text)



$$*IF_{\text{soil/age-adj.}} = \frac{IR_{\text{soil/age 1-6}} \times ED_{\text{age 1-6}}}{BW_{\text{age 1-6}}} + \frac{IR_{\text{soil/age 7-31}} \times ED_{\text{age 7-31}}}{BW_{\text{age 7-31}}}$$

where,

$IR_{\text{soil/age 1-6}}$ (soil ingestion rate)	= 200 mg/day
$ED_{\text{age 1-6}}$ (exposure duration)	= 6 years
$BW_{\text{age 1-6}}$ (body weight)	= 15 kg
$IR_{\text{soil/age 7-31}}$ (soil ingestion rate)	= 100 mg/d
$ED_{\text{age 7-31}}$ (exposure duration)	= 24 yr
$BW_{\text{age 7-31}}$ (body weight)	= 70 kg

$$**DF_{\text{soil/age-adj.}} = \frac{SA_{\text{age 1-6}} \times AF \times ED_{\text{age 1-6}}}{BW_{\text{age 1-6}}} + \frac{SA_{\text{age 7-31}} \times AF \times ED_{\text{age 7-31}}}{BW_{\text{age 7-31}}}$$

where,

$SA_{\text{age 1-6}}$ (skin surface area)	= 1820 cm <sup>2</sup> /day
AF (soil adherence factor)	= 1.0 mg/cm <sup>2</sup>
$ED_{\text{age 1-6}}$ (exposure duration)	= 6 years
$BW_{\text{age 1-6}}$ (body weight)	= 15 kg
$SA_{\text{age 7-31}}$ (skin surface area)	= 5000 cm <sup>2</sup> /day
AF (soil adherence factor)	= 1.0 mg/cm <sup>2</sup>
$ED_{\text{age 7-31}}$ (exposure duration)	= 24 yr
$BW_{\text{age 7-31}}$ (body weight)	= 70 kg

The residential equations yield values which represent concentrations of contaminants in water in units of micrograms per liter (ug/l) and in soil in units of micrograms per kilogram (ug/kg), or parts per billion (ppb). To convert to units of parts per million or milligrams per liter (mg/l) in water and milligrams per kilogram (mg/kg) in soil, divide by 1,000.

All exposure assumptions represent current EPA guidance. The selection of an appropriate averaging time (AT) is dependent upon the type of toxic effect being evaluated. AT represents the number of days over which the exposure is averaged. When evaluating long-term exposure to noncarcinogenic compounds, exposures are calculated by averaging over the period of exposure (i.e., subchronic or chronic exposures). For carcinogenic compounds, exposures are calculated by prorating the total cumulative dose over a lifetime (also called lifetime average daily dose). The approach for carcinogens is based on the assumption that a high dose of a carcinogen received over a short period of time is equivalent to a corresponding low dose spread over a lifetime. The averaging time for carcinogens is 25,550 days (70 years x 365 days) and 10,950 days (30 years x 365 days) for noncarcinogens.

The acceptable level of risk for carcinogens has been changed from one in one million ( $10^{-6}$ ) to one in one hundred thousand ( $10^{-5}$ ). All criteria for carcinogens have been changed appropriately. The acceptable hazard quotient (HQ) for noncarcinogens has always been 1, although this parameter was not explicitly presented in the previous MERA equations. The HQ is the ratio of a single substance's exposure level over a specified time period to a reference dose for that substance derived from a similar exposure period. An HQ of 1 indicates that an exposure level greater than the reference dose is unacceptable.

The relative source contribution factor (RSC) of 20% remains a parameter within the equations for groundwater criteria for noncarcinogens to maintain consistency with the EPA and State of Michigan in their development of

drinking water standards. The 20% RSC represents a default value to be replaced with a chemical-specific value when data are available. The RSC has been eliminated from the equations for the direct contact soil criteria. (For additional discussion on the RSC, see Operational Memo #14.)

The exposure duration of 30 years represents a national upper-bound time (90th percentile) at one residence (EPA, 1989). The exposure frequency (EF) of 350 represents the number of days per year that a resident is exposed to drinking water at their home; it assumes that people spend approximately 15 days per year away from their homes for vacations or other reasons. Two separate EF values are used for exposure to soil, each specific to the ingestion and dermal routes of exposure.

For ingestion of soil, EPA guidance ("Standard Default Exposure Factors" OSWER Directive: 9285.6-03, March 25, 1991) recommends a daily intake rate of 200 mg/day for children aged 1-6 years and 100 mg/day for all others. These intake values are believed to represent upper-bound estimates of average soil ingestion rates.

The EPA-recommended soil ingestion rates account for ingestion of both outdoor soils and indoor dust. The values are derived primarily from fecal tracer studies which estimate the amount of soil ingested throughout a day's activities. As such, the intake rates are not event-specific (i.e. the rates do not represent the amount of soil ingested during outdoor activities). Data suggest that up to 80% of indoor dust consists of outdoor soils which have been brought into a residence by air deposition and foot traffic. Therefore, it may not be assumed that ingestion of contaminated soil is entirely precluded by climatic conditions such as snow cover.

There is no currently available method for determining the relative contribution of soil vs. dust to the daily total, or the effect of climatic conditions on the rate of soil ingestion. Therefore, a constant year round exposure is assumed and the appropriate EF value for ingestion of soil/dust for the residential soil direct contact criterion is 350 days per year.

The EPA recommends that local weather conditions such as snow cover be considered in determining the appropriate EF for dermal contact with soil. It is assumed that Michigan winters last for 4 months (120 days) making soil unavailable for contact. Therefore, the EF for dermal contact with soil for the residential soil direct contact criterion is 245 days per year (365-120).

Ingestion and dermal contact rates within the direct contact soil criterion equation are adjusted to account for both children and adults. It is assumed that during the 30 year exposure period, 6 years is spent as a child who ingests more soil/day and the remaining 24 years is spent as a child/adult ingesting less soil/day. The age-adjusted approach was previously used in the development of the Type B soil direct contact criteria (although the data and calculations were different) and is recommended by EPA (EPA, 1991).

The skin surface area for child and adult receptors in the age-adjusted dermal factor is equal to 25 percent of the 50th percentile of total skin surface area for the respective age group (EPA, 1992b). Dermal exposure to soil is expected to occur on the hands, arms, legs, neck and head, accounting for approximately 25% of the total skin surface area.

The absorption efficiencies are the same as those used previously. When chemical-specific data are not available, the absorption efficiency applicable

to ingestion ( $AE_1$ ) shall be either 100% for volatile organic chemicals or 50% for other organic chemicals, polychlorinated biphenyls, pesticides, or inorganic parameters. When chemical-specific data are not available, the absorption efficiency applicable to dermal contact ( $AE_d$ ) shall be either 10% for a volatile organic chemical or 1% for other organic chemicals, polychlorinated biphenyls, pesticides, or inorganic parameters.

This memo is intended to provide guidance to Division staff to foster consistent application of Part 201 of the Natural Resources and Environmental Protection Act, 1994 PA 451 and associated Administrative Rules. This document is not intended to convey any rights to any parties nor create any duties or responsibilities under law. This document and matters addressed herein are subject to revision.

Questions about values in the attached table should be directed to one of the ERD toxicologists: Christine Flaga, telephone 517-373-0160, Jeffrey Crum, telephone 517-335-3092, or Linda Larsen, telephone 517-335-3161. Other questions about this memorandum should be directed to District Supervisors.

Attachment  
rev. 4

#### REFERENCES

- EPA, 1992a. Supplemental Guidance to RAGS: Calculating the Concentration Term. OSWER Publication 9285.7-081. May, 1992.
- EPA, 1992b. Dermal Exposure Assessment: Principles and Applications. Interim Report. EPA/600/8-91/011B. January, 1992.

*A. G. Howard*

PART 201 OF THE NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION ACT, 1994

PA 451

GENERIC RESIDENTIAL CLEANUP CRITERIA FOR GROUNDWATER AND SOIL

(Revision 4)

Residential criteria were calculated using currently available toxicological data. These criteria may change as new toxicity data become available. They are not necessarily final cleanup standards. Please read the attached introduction for details. Carcinogenic chemicals are shown in bold italics. All values are expressed in units of parts per billion (ppb); ug/l in water and ug/kg in soil. Scientific notation is represented by E+ or E- a value, for example  $2 \times 10^6$  is reported as 2E+6. Please refer to Operational Memorandum #6 for additional information concerning analytical methods and method detection limits.

Chemical	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	20X Drinking Water Value	20X GSI Value	Direct Contact Value	Target Method Detection Limit in Soil
Acenaphthene	1,300	NA	3.8	5	26,000	78	7.6E+7	330
Acenaphthylene	26	NA	(B)	5	520	(B)	1.5E+6	330
Acetaldehyde	950	NA	(B)	500	19,000	(B)	1.4E+7	2,500
Acetic acid	4,200	NA	(B)	18,000	84,000	(B)	6.3E+7	9.0E+5
Acetone	730	NA	25,000	100	15,000	5.0E+5	1.1E+7	100
Acetonitrile	140	NA	810	50	2,800	16,000	2.1E+6	100
Acrolein	120	NA	2.5	5	2,400	50	1.8E+6	10
Acrylamide	0.19	NA	9.1	0.5	3.8	180	2,200	5
Acrylic acid	3,900	NA	(B)	NA	78,000	(B)	5.8E+7	NA
<i>acrylonitrile</i>	1.6	NA	2.2	1	32	44	4,700	10
<i>Alachlor</i>	2 (C)	NA	48	1	40	960	1.2E+5	20
Aldicarb	3 (C)	NA	(B)	2	60	(B)	4.2E+5	50
Aldicarb sulfoxide	4 (C)	NA	(B)	2	80	(B)	5.5E+5	50
Aldicarb sulfone	2 (C)	NA	(B)	2	40	(B)	4.6E+5	50
<i>Aldrin</i>	0.05	NA	0.0014	0.01	(E)	(E)	580	20
Aluminum	ID	50 (A,F)	(B)	100	1,000	(B)	ID	700
Ammonia	ID (P)	NA	20 (D)	50	ID (P)	400	ID (P)	1,000
<i>Aniline</i>	150	NA	4	20	3,000	80	1.7E+6	1,700
Anthracene	7,300	NA	1.1E+5	5	1.5E+5	2.2E+6	4.2E+8	330
Antimony	6 (A,C)	NA	50 (A)	5	120 (A)	1,000	1.5E+5	500
<i>Arsenic</i>	50 (A,C)	NA	11 (A)	5	1,000 (A)	220 (A)	5,500 (A)	100
<i>Atrazine</i>	3 (C)	NA	7.8	1	60	160	45,000	50
<i>Azobenzene</i>	7.7	NA	(B)	NA	150	(B)	90,000	NA
Barium	2,000 (A,C)	NA	630 (A,D)	200	40,000 (A)	13,000 (A)	3.0E+7	1,000
<i>Benzene</i>	5 (C)	NA	53	5	100	1,100	88,000	10
<i>Benzidine</i>	0.0037	NA	0.0054	50	0.074	0.11	43	1,000
<i>Benzo(a)anthracene (Q)</i>	1.2	NA	0.31	5	(E)	(E)	14,000	330
<i>Benzo(b)fluoranthene (Q)</i>	1.2	NA	0.31	5	(E)	(E)	14,000	330
<i>Benzo(k)fluoranthene (Q)</i>	12	NA	0.31	5	(E)	(E)	1.4E+5	330
<i>benzo(g,h,i)perylene</i>	26	NA	(B)	5	(E)	(E)	1.5E+6	330

# GENERIC RESIDENTIAL CLEANUP CRITERIA

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Chemical	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	20X Drinking Water Value	20X GSI Value	Direct Contact Value	Target Method Detection Limit in Soil
<i>Benzo(a)pyrene (Q)</i>	0.2 (C)	NA	0.31	5	(E)	(E)	1,400	330
Benzoic acid	32,000	NA	(B)	50	6.4E+5	(B)	1E+9 (G)	3,300
Benzyl alcohol	10,000	NA	22	50	2.0E+5	440	1.6E+8	1,300
<i>Benzyl chloride</i>	5	NA	(B)	0.5	100	(B)	15,000	200
<i>Beryllium</i>	4 (C)	NA	(B)	1	80	(B)	2,300	200
Bis(2-chloroethoxy)ethane	ID	NA	(B)	5	ID	(B)	ID	330
<i>bis(2-Chloroethyl)ether</i>	0.77	NA	4.2	5	15	84	2,300	330
<i>bis(2-Ethylhexyl)phthalate</i>	6 (C)	NA	59	5	(E)	(E)	7.0E+5	330
Boron	440 (A)	NA	(B)	300	8,800 (A)	(B)	2.5E+7	8,000
Bromobenzene	ID	NA	(B)	1	ID	(B)	ID	10
<i>Bromodichloromethane</i>	100 (C,S)	NA	24	1	2,000 (S)	480	41,000	10
<i>Bromoform</i>	100 (C,S)	NA	65	1	2,000 (S)	1,300	3.2E+5	10
Bromomethane	10	NA	11	1	200	220	1.5E+5	10
n-Butanol	950	NA	(B)	800	19,000	(B)	1.4E+7	4,400
2-Butanone (MEK)	13,000	NA	7,200	50	2.6E+5	1.4E+5	2.0E+8	100
n-Butyl acetate	550	NA	40	10	11,000	800	8.3E+6	20
t-Butyl alcohol	3,900	NA	8,300	1,000	78,000	1.7E+5	5.9E+7	4,400
Butyl benzyl phthalate	1,200	NA	(B)	5	24,000	(B)	6.8E+7	330
Cadmium	5 (A,C)	NA	0.64 (A,D)	0.5	100 (A)	13 (A)	2.1E+5	50
Camphene	ID	NA	(B)	NA	ID	(B)	ID	NA
Caprolactam	5,800	NA	(B)	NA	1.2E+5	(B)	3.4E+8	NA
Carbaryl	700	NA	(B)	20	14,000	(B)	4.1E+7	1,000
Carbofuran	40 (C)	NA	1.6	20	800	32	5.5E+5	200
Carbon disulfide (R)	800	NA	(B)	50	16,000	(B)	1.2E+7	100
<i>Carbon tetrachloride</i>	5 (C)	NA	21	1	100	420	20,000	10
<i>Chlordane</i>	2 (C)	NA	0.00053	0.02	(E)	(E)	7,600	10
Chloride	ID	2.5E+5	(B)	10,000	5.0E+5	(B)	ID	2.0E+5
Chlorobenzene	100 (C)	NA	71	1	2,000	1,400	2.1E+8	10
<i>Chloroethane</i>	220	NA	(B)	1	4,400	(B)	6.7E+5	10
2-Chloroethyl vinyl ether	ID	NA	(B)	10	ID	(B)	ID	100
<i>Chloroform</i>	100 (C,S)	NA	80	1	2,000 (S)	1,000	4.2E+5	10
<i>Chloromethane</i>	68	NA	(B)	1	1,300	(B)	2.0E+5	10
4-Chloro-3-methylphenol	150	NA	4.4	5	3,000	88	2.2E+6	330
beta-Chloronaphthalene	1,800	NA	(B)	5	36,000	(B)	2.7E+7	330
2-Chlorophenol	45	NA	10	5	900	200	6.8E+5	330
o-Chlorotoluene	150	NA	(B)	1	3,000	(B)	2.2E+6	10
Chlorpyrifos	22	NA	0.002	0.2	440	0.04	1.3E+6	10
Chromium (III) (I)	100 (A,C,J)	NA	77 (A,D)	50	2,000 (A)	1,500 (A)	6.3E+8	2,500
Chromium (VI) (I)	100 (A,C,J)	NA	7.3 (A)	5	2,000 (A)	150 (A)	2.0E+6	200

# GENERIC RESIDENTIAL CLEANUP CRITERIA

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Chemical	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	20X Drinking Water Value	20X GSI Value	Direct Contact Value	Target Method Detection Limit in Soil
<i>Chrysene (Q)</i>	120	NA	0.31	5	(E)	(E)	1.4E+6	330
Cobalt	37	NA	(B)	10	740	(B)	2.1E+6	500
Copper	1,400 (A)	1,000	18 (A,D)	25	20,000	360 (A)	1.6E+7	1,000
Cyanazine	1.5	NA	4.7	10	30	94	17,000	500
Cyanide (R)	200 (C)	NA	5.2	20	4,000	100	9.3E+6	500
Cyclohexanone	33,000	NA	(B)	50	6.6E+5	(B)	5.0E+8	100
Dacthal	73	NA	(B)	1	1,500	(B)	4.2E+6	20
Delapron	200 (C)	NA	(B)	10	4,000	(B)	9.3E+6	100
4-4'-DDD	3.5	NA	0.0084	0.02	(E)	(E)	41,000	20
4-4'-DDE	2.5	NA	0.0059	0.02	(E)	(E)	29,000	20
4-4'-DDT	2.5	NA	0.00023	0.02	(E)	(E)	29,000	20
Decabromodiphenyl ether	73	NA	(B)	10	1,500	(B)	4.2E+6	100
Di-n-butyl phthalate	880	NA	12,000	5	18,000	2.4E+5	5.1E+7	330
Di(2-ethylhexyl) adipate	400 (C)	NA	(B)	5	8,000	(B)	2.1E+6	330
Di-n-octyl phthalate	130	NA	(B)	5	2,600	(B)	7.6E+6	330
Diacetone alcohol	ID	NA	(B)	NA	ID	(B)	ID	NA
Diazinon	1.3	NA	0.002	0.5	26	0.04	76,000	10
Benzo(a,h)anthracene (Q)	0.12	NA	0.31	5	(E)	(E)	1,400	330
Dibenzofuran	ID	NA	(B)	5	ID	(B)	ID	330
Dibromochloromethane	100 (C,S)	NA	29	1	2,000	580	31,000	10
Dibromomethane	80	NA	(B)	5	1,600	(B)	4.6E+6	10
1,2-Dichlorobenzene	600 (C)	NA	7	1	12,000	140	9.4E+6	10
1,3-Dichlorobenzene	600 (C)	NA	180	1	12,000	3,600	9.4E+6	10
1,4-Dichlorobenzene	75 (C)	NA	15	1	1,500	300	1.1E+5	10
3,3'-Dichlorobenzidine	1.9	NA	0.063	20	38	1.3	5,700	2,000
Dichlorodifluoromethane	1,700	NA	(B)	1	34,000	(B)	2.5E+7	10
1,1-Dichloroethane	880	NA	(B)	1	18,000	(B)	1.3E+7	10
1,2-Dichloroethane	5 (C)	NA	560	1	100	11,000	28,000	10
1,1-Dichloroethylene	7 (C)	NA	32	1	140	640	1.1E+5	10
cis-1,2-Dichloroethylene	70 (C)	NA	(B)	1	1,400	(B)	1.2E+6	10
trans-1,2-Dichloroethylene	100 (C)	NA	300	1	2,000	6,000	1.9E+6	10
2,6-Dichloro-4-nitroaniline	2,200	NA	(B)	0.01	44,000	(B)	1.3E+8	0.1
2,4-Dichlorophenol	73	NA	34 (D)	5	1,500	680	4.2E+6	330
2,4-Dichlorophenoxyacetic acid	70 (C)	NA	47	10	1,400	940	4.2E+6	200
1,2-Dichloropropane	5 (C)	NA	64	1	100	1,300	38,000	10
1,3-Dichloropropane (J)	4.7	NA	3	1	96	60	14,000	10
Dichloroacetic acid	2.9	NA	(B)	0.1	58	(B)	34,000	50
Dicyclohexyl phthalate	ID	NA	(B)	5	ID	(B)	ID	330
Endrin	0.053	NA	3.2E-5	0.02	(E)	(E)	620	20

# GENERIC RESIDENTIAL CLEANUP CRITERIA

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Chemical	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	20X Drinking Water Value	20X GSI Value	Direct Contact Value	Target Method Detection Limit in Soil
Diethoxymethane	ID	NA	(B)	10	ID	(B)	ID	100
Diethyl ether	3,700	NA	(B)	50	74,000	(B)	5.5E+7	100
Diethyl phthalate	5,500	NA	1.2E+5	5	1.1E+5	2.4E+8	3.2E+8	330
Diethylene glycol monobutyl ether	88	NA	(B)	NA	1,800	(B)	5.1E+8	NA
Diisopropylamine	5.8	NA	(B)	NA	110	(B)	85,000	NA
Dimethyl phthalate	73,000	NA	2.9E+8	5	1.5E+8	5.8E+7	1E+9 (G)	330
N,N-Dimethylacetamide	180	NA	(B)	NA	3,600	(B)	2.7E+8	NA
N,N-Dimethylaniline	18	NA	(B)	NA	320	(B)	2.4E+5	NA
Dimethylformamide	700	NA	3,800	NA	14,000	78,000	1.1E+7	NA
2,4-Dimethylphenol	370	NA	31	5	7,400	620	2.1E+7	330
2,6-Dimethylphenol	4.4	NA	(B)	5	88	(B)	2.5E+5	330
3,4-Dimethylphenol	10	NA	(B)	5	200	(B)	5.9E+5	330
Dimethylsulfoxide	2.2E+5	NA	(B)	NA	4.4E+8	(B)	1.0E+9 (G)	NA
2,4-Dinitrotoluene	1.3	NA	91	5	28	1,800	15,000	330
Dinoseb	7 (C)	NA	0.5 (D)	1	140	10	4.2E+8	20
1,4-Dioxane	77	NA	2,000	1	1,500	40,000	2.3E+5	10
Diquat	20 (C)	NA	(B)	1	400	(B)	9.3E+5	NA
Endosulfan (J)	1.7	NA	(B)	0.01	(E)	(E)	97,000	3.3
Endothal	100 (C)	NA	(B)	20	2,000	(B)	7.2E+8	NA
Endrin	2 (C)	NA	0.0023	0.02	(E)	(E)	72,000	20
Epichlorohydrin	86	NA	(B)	5	1,700	(B)	2.6E+5	10
Ethanol	2.0E+8	NA	41,000	1,000	4.0E+7	8.2E+5	1.0E+9 (G)	4,400
Ethyl acetate	6,600	NA	1,000	NA	1.3E+5	20,000	9.9E+7	NA
1-Ethyl-2-methylbenzene	ID	NA	(B)	NA	ID	(B)	ID	NA
Ethylbenzene	700 (C)	74	31	1	1,500	620	1.1E+7	10
Ethylene dibromide	0.05 (C)	NA	1.1	1	1	22	30	10
Ethylene glycol	15,000	NA	68,000	5,000	3.0E+5	1.4E+6	8.4E+8	5,000
Ethylene glycol acetate	ID	NA	(B)	NA	ID	(B)	ID	NA
Ethylene glycol monobutyl ether	85	NA	(B)	NA	1,900	(B)	1.4E+8	NA
Fluoranthene	880	NA	370	5	18,000	7,400	5.1E+7	330
Fluorene	880	NA	14,000	5	18,000	2.8E+5	5.1E+7	330
Fluorine	400 (C)	2,000	1,900	NA	8,000	38,000	2.5E+7	NA
Formaldehyde	1,300	NA	170	100	28,000	3,400	2.0E+7	500
Formic acid	10,000	NA	(B)	18,000	2.0E+5	(B)	1.5E+8	9.0E+5
1-Formylpiperidine	80	NA	(B)	NA	1,600	(B)	1.2E+8	NA
Gentian violet	8.5	NA	(B)	NA	170	(B)	99,000	NA
Glyphosate	700 (C)	NA	(B)	100	14,000	(B)	4.2E+7	NA
Heptachlor	0.4 (C)	NA	0.0018	0.01	(E)	(E)	2,200	20
Heptachlor epoxide	0.2 (C)	NA	0.0011	0.01	(E)	(E)	1,100	20

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Chemical	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	20X Drinking Water Value	20X GSI Value	Direct Contact Value	Target Method Detection Limit in Soil
n-Heptane	32,000	NA	4	NA	6.4E+5	80	4.8E+8	NA
Hexabromobenzene	20	NA	(B)	(K)	400	(B)	1.2E+6	(K)
Hexachlorobenzene (C-86)	1 (C)	NA	0.0019	(K)	20	0.038	6,200	(K)
Hexachlorobutadiene (C-46)	11	NA	500	(K)	220	10,000	1.3E+5	(K)
alpha-Hexachlorocyclohexane	0.14	NA	0.13	0.01	2.8	2.6	1,600	20
beta-Hexachlorocyclohexane	0.47	NA	0.46	0.01	9.8	9.2	5,500	20
Hexachlorocyclopentadiene (C-56)	50 (C)	NA	0.54	(K)	1,000	11	3.0E+6	(K)
Hexachloroethane	61	NA	13	2	1,200	260	1.8E+5	50
n-Hexane	3,000	NA	(B)	NA	60,000	(B)	4.5E+7	NA
2-Hexanone	1,000	NA	(B)	50	20,000	(B)	1.5E+7	100
Indeno(1,2,3-cd)pyrene (Q)	1.2	NA	0.31	5	(E)	(E)	14,000	330
Iron	ID	300 (A)	(B)	100	6,000 (A)	(B)	ID	2,000
Isobutyl alcohol	2,300	NA	(B)	1,000	48,000	(B)	3.5E+7	4,400
Isophorone	900	NA	860	5	18,000	17,000	2.7E+6	330
Isopropyl alcohol	470	NA	21,000	400	9,400	4.2E+5	7.0E+6	4,400
Lead	4 (A,L)	NA	6.6 (A,D)	3	80 (A)	130 (A)	4.0E+5	1,000
Lindane	0.2 (C)	NA	0.08	0.01	4	1.6	7,600	20
cesium	4.2E+5	NA	(B)	30	8.4E+6	1.0E+9	1.0E+9 (G)	3,000
Manganese	180 (A)	50 (A)	(B)	20	1,000 (A)	(B)	2.0E+6	2,000
Mercury (Inorganic)	2 (A,C)	NA	0.0013 (A)	0.2	40 (A)	0.028 (A)	1.3E+5	100
Methanol	3,700	NA	41,000	1,000	74,000	8.2E+5	5.5E+7	4,400
Methoxychlor	40 (C)	NA	(B)	0.5	80	(B)	2.1E+6	50
2-Methoxyethanol	29	NA	(B)	NA	580	(B)	4.4E+5	NA
2-Methyl-4-chlorophenoxyacetic acid	7.3	NA	(B)	0.5	150	(B)	4.2E+5	100
2-Methyl-4,6-dinitrophenol	2.6	NA	0.59	20	52	12	1.5E+5	1,700
4-Methyl-2-pentanone (MIBK)	370	NA	(B)	50	7,400	(B)	5.5E+6	100
Methyl-tert-butyl ether (MTBE)	240	NA	380	50	4,800	7,800	3.6E+6	100
N-Methyl-morpholine	20	NA	(B)	NA	400	(B)	3.0E+5	NA
Methylcyclopentane	ID	NA	(B)	50	ID	(B)	ID	500
4,4'-Methylene-bis-2-chloroaniline (M)	0.88	NA	(B)	1	(E)	(E)	10,000	50
Methylene chloride	5 (C)	NA	59	5	100	1,200	3.4E+5	10
2-Methylnaphthalene	ID	NA	(B)	5	ID	(B)	ID	330
2-Methylphenol	370	NA	38	5	7,400	760	5.5E+6	330
3-Methylphenol	370	NA	(B)	5	7,400	(B)	2.1E+7	330
4-Methylphenol	37	NA	6.2	5	740	120	2.1E+6	330
Metolachlor	160	NA	150	10	3,200	3,000	1.9E+6	50
Molybdenum	37 (A)	NA	800 (A)	10	740	16,000 (A)	2.1E+6	100
ophthalene	260	NA	29	5	5,200	580	1.5E+7	330
Nickel	100 (A,C)	NA	57 (A,D)	50	2,000 (A)	1,100 (A)	3.2E+7	1,000



# GENERIC RESIDENTIAL CLEANUP CRITERIA

REVISION 4

Chemical	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	20X Drinking Water Value	20X GSI Value	Direct Contact Value	Target Method Detection Limit in Soil
Nitrate (P)	10,000 (C,P)	NA	(B)	100	2.0E+5 (P)	(B)	ID	NA
Nitrite (P)	1,000 (C,P)	NA	(B)	100	20,000 (P)	(B)	ID	NA
Nitrobenzene	3.4	NA	1,900	5	68	38,000	51,000	330
2-Nitrophenol	20	NA	(B)	5	400	(B)	1.2E+6	330
<i>n</i> -Nitroso-di- <i>n</i> -propylamine	0.12	NA	(B)	5	2.4	(B)	370	330
<i>N</i> -Nitrosodiphenylamine	170	NA	160	5	3,400	3,200	5.2E+5	330
Oxamyl	200 (C)	NA	(B)	NA	4,000	(B)	1.6E+7	NA
Oxo-hexyl acetate	73	NA	(B)	NA	1,500	(B)	1.1E+6	NA
Pendimethalin	880	NA	0.62	0.1	18,000	12	5.1E+7	20
Pentachlorobenzene	6.1	NA	(B)	2	120	(B)	3.5E+5	50
Pentachloronitrobenzene	55	NA	(B)	2	1,100	(B)	3.2E+6	50
Pentachlorophenol	1 (C)	NA	0.8 (D)	20	20	16	82,000	3,400
Pentene	ID	NA	(B)	100	ID	(B)	ID	1,000
2-Pentene	ID	NA	(B)	NA	ID	(B)	ID	NA
Phenanthrene	28	NA	(B)	5	520	(B)	1.5E+6	330
Phenol	4,400	NA	1,100	5	88,000	22,000	6.6E+7	330
Picloram	500 (C)	NA	(B)	10	10,000	(B)	3.0E+7	100
Piperidine	3.2	NA	(B)	NA	64	(B)	48,000	NA
Polybrominated biphenyls (J)	0.098	NA	(B)	NA	(E)	(E)	1,100	NA
Polychlorinated biphenyls (PCBs) (J,T)	0.5 (C)	NA	2.0E-5	0.2	(E)	(E)	2,300	330
Prometon	160	NA	(B)	0.5	3,200	(B)	9.3E+6	20
Propachlor	95	NA	(B)	1	1,900	(B)	5.5E+6	20
Propazine	200	NA	(B)	0.5	4,000	(B)	1.1E+7	20
Propionic acid	12,000	NA	(B)	100	2.4E+5	(B)	1.9E+8	6,700
Propyl alcohol	1,400	NA	15,000	NA	28,000	3.0E+5	2.1E+7	NA
Propylene glycol	1.5E+5	NA	1.9E+5	5,000	3.0E+6	3.8E+6	1.0E+9 (G)	5,000
Pyrene	550	NA	11,000	5	11,000	2.2E+5	3.2E+7	330
Pyridine	7.3	NA	20	20	150	400	1.1E+5	330
Selenium	50 (A,C)	NA	5 (A)	5	1,000 (A)	100 (A)	2.1E+6	500
Silver	34 (A)	100	0.1 (A)	0.5	680 (A)	2 (A)	2.0E+6	500
Simazine	4 (C)	NA	3.4	10	80	68	2.2E+6	40
Sodium	1.6E+5	NA	(B)	NA	3.2E+6	(B)	1.0E+9 (G)	NA
Styrene	100 (C)	NA	19	1	2,000	380	85,000	10
Sulfate	ID	2.5E+5	(B)	NA	5.0E+6	(B)	ID	NA
Tebuthiuron	510	NA	(B)	NA	10,000	(B)	3.0E+7	NA
2,3,7,8-Tetrabromodibenzo-p-dioxin (O)	(O)	NA	(O)	0.0001	(E)	(E)	(O)	0.01
1,2,4,5-Tetrachlorobenzene	2,500	NA	0.4	0.1	50,000	8	1.4E+8	20
2,3,7,8-Tetrachlorodibenzo-p-dioxin (O)	3E-5 (C)	NA	1.4E-8	1.0E-5	(E)	(E)	0.09	0.001
1,1,1,2-Tetrachloroethane	33	NA	(B)	1	660	(B)	98,000	10

GENERIC RESIDENTIAL CLEANUP CRITERIA

REVISION 4

Chemical	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	20X Drinking Water Value	20X GSI Value	Direct Contact Value	Target Method Detection Limit in Soil
<b>1,1,2,2-Tetrachloroethane</b>	4.3	NA	32	1	86	640	13,000	10
<b>Tetrachloroethylene</b>	5 (C)	NA	22	1	100	440	50,000	10
Tetrahydrofuran	240	NA	3,300	1,000	4,800	66,000	3.6E+6	10,000
Thallium	2 (A,C)	NA	5.4 (A)	2	40 (A)	110 (A)	28,000	500
Toluene	1,000 (C)	790	110	1	16,000	2,200	2.4E+7	10
<i>p</i> -Toluidine	4.5	NA	(B)	NA	90	(B)	52,000	NA
Toxaphene	3 (C)	NA	0.0002	1	60	0.004	2,300	170
Triallate	95	NA	(B)	1	1,900	(B)	5.5E+6	20
Tributylamine	10	NA	(B)	NA	200	(B)	1.5E+5	NA
1,2,4-Trichlorobenzene	70 (C)	NA	22	5	1,400	440	6.3E+6	330
1,1,1-Trichloroethane	200 (C)	NA	120	1	4,000	2,400	3.1E+6	10
1,1,2-Trichloroethane	5 (C)	NA	65	1	100	1,300	45,000	10
Trichloroethylene	5 (C)	NA	94	1	100	1,900	1.6E+5	10
Trichlorofluoromethane	2,600	NA	580	1	52,000	12,000	3.8E+7	10
2,4,5-Trichlorophenol	730	NA	25	50	15,000	500	4.2E+7	1,700
2,4,6-Trichlorophenol	77	NA	27 (D)	5	1,500	540	9.0E+5	330
2(2,4,5-Trichlorophenoxy)propionic acid (N)	50 (C)	NA	21	1	1,000	420	3.2E+6	50
1,3-Trichloropropane	42	NA	(B)	1	840	(B)	2.4E+6	10
1,1,2-Trichloro-1,2,2-trifluoroethane	2.0E+5	NA	33	NA	4.0E+6	660	1.0E+9 (G)	NA
Triethanolamine	3,700	NA	(B)	NA	74,000	(B)	5.5E+7	NA
3-Trifluoromethyl-4-nitrophenol	4,500	NA	32 (D)	NA	90,000	640	2.6E+8	NA
Trifluralin	110	NA	(B)	1	2,200	(B)	1.3E+6	50
2,2,4-Trimethyl pentane	ID	NA	(B)	50	ID	(B)	ID	500
2,2,4-Trimethyl-2-pentene	ID	NA	(B)	NA	ID	(B)	ID	NA
1,2,4-Trimethylbenzene	30	NA	22	1	600	440	4.5E+5	10
1,3,5-Trimethylbenzene	23	NA	28	1	460	520	3.4E+5	10
tris(2,3-Dibromopropyl)phosphate	0.47	NA	(B)	NA	9.4	(B)	5,500	NA
Urea	ID (P)	NA	(B)	400	ID (P)	(B)	ID (P)	20,000
Vanadium	64 (A)	NA	8 (A)	20	1,300 (A)	160 (A)	3.7E+6	1,000
Vinyl acetate	640	NA	(B)	50	13,000	(B)	9.7E+6	100
Vinyl chloride	2 (C)	NA	3.1	1	40	62	1,200	10
White phosphorus (R)	0.11	NA	(B)	NA	2.2	(B)	6,300	NA
Xylenes	10,000 (C)	280	59	3	5,600	1,200	2.0E+6	30
Zinc	2,400 (A)	5,000 (A)	81 (A,D)	20	48,000 (A)	1,600 (A)	1.4E+6	1,000

## Footnotes

- {A} Background, as defined in Rule 701(c), may be substituted if higher than the cleanup criteria.
- {B} Chemical has either not been evaluated or an inadequate data base precludes the development of a GSI value. Contact an ERD toxicologist for assistance.
- {C} State of Michigan Drinking Water Standard established pursuant to Section 5 of the Safe Drinking Water Act, Act No. 399 of the Public Acts of 1976 used as the default.
- {D} GSI value is pH, temperature, or water hardness dependent. Contact an ERD toxicologist for details.
- {E} Chemical, due to its physicochemical properties, is not expected to leach through soils to groundwater under most conditions.
- {F} Professional judgment used to determine that 50 ppb of aluminum in drinking water is protective of human health.
- {G} Criteria exceeds 100% in soil, hence it is reduced to 100%.
- {H} Criteria is based on agricultural impacts (phytotoxicity), not 20X groundwater criterion.
- {I} Valence-specific chromium data (Cr III and Cr VI) must be compared to the same valence-specific cleanup criteria. If analytical data are provided for "total" chromium only, then values for chromium VI must be applied as the cleanup criteria. Chromium III cleanup criteria can only be used at sites where groundwater is prevented from being used as a public water supply, currently or in the future.
- {J} Chemical may be present in several isomer forms. Isomer specific concentrations must be combined for comparison to criteria. Contact an ERD toxicologist for further explanation.
- {K} Two different analytical methods and target method detection limits are available for this chemical. Refer to Operational Memorandum #8 for details.
- {L} Criteria developed using the U.S. EPA Integrated Uptake Biokinetic Model for children. No risk assessment method(s) is currently available to evaluate lead toxicity in adults. Higher level may be acceptable if soil concentration is less than 400 ppm and groundwater migrating off-site will not impact adjacent properties. Contact an ERD toxicologist for further explanation.
- {M} Also known as MBOCA.
- {N} Also known as Silvex.
- {O} Use 2,3,7,8-TCDD "toxicity equivalence factors" (TEFs) for other chlorinated and /or brominated dibenzo-p-dioxins and chlorinated and/or brominated dibenzofurans for comparison to cleanup criteria. Contact an ERD toxicologist for details.
- {P} All potential sources of nitrogen-nitrate must be combined and compared to nitrate criteria. Contact an ERD toxicologist for details.
- {Q} Criteria for carcinogenic polynuclear aromatic hydrocarbons (PAHs) were developed using "relative potential potencies" (RPPs) to benzo(a)pyrene.
- {R} Chemical may be reactive in soil.
- {S} Concentrations of trihalomethanes in groundwater must be combined to determine compliance with the health-based drinking water value of 100 ppb.
- {T} Toxic Substances Control Act, Subpart G - PCB Spill Cleanup Policy standards may be more restrictive.

ID = Inadequate data to develop criterion; NA = Not available.

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

June 6, 1995

TO: Environmental Response Division Staff

FROM: Alan J. Howard, Chief, Environmental Response Division

SUBJECT: Environmental Response Division Operational Memorandum #14  
Revision 2: Remedial Action Plans Using Generic Industrial or  
Generic Commercial Cleanup Criteria and Other Requirements

THIS DRAFT, INTERIM OPERATIONAL MEMORANDUM HAS BEEN PREPARED TO FACILITATE IMPLEMENTATION OF THE 1995 AMENDMENTS TO PART 201 OF THE NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION ACT, 1994 PA 451 (FORMERLY THE MICHIGAN ENVIRONMENTAL RESPONSE ACT). THIS OPERATIONAL MEMORANDUM WILL TAKE EFFECT ONLY WHEN HOUSE BILL 4596 IS SIGNED INTO LAW. INTERNAL REVIEW OF THIS MEMORANDUM IS ON-GOING, AND NO OUTSIDE REVIEW HAS BEEN COMPLETED. THE CONTENT OF THE MEMORANDUM, AND THE ATTACHED CRITERIA, ARE SUBJECT TO CHANGE AND SHOULD BE RELIED UPON ONLY AFTER CONFIRMATION WITH APPROPRIATE ERD STAFF.

Revision 2 of this Operational Memorandum reflects changes made as a result of two major legislative actions: (1) the incorporation of the Michigan Environmental Response Act (MERA), 1982 PA 307, as amended, (2) into the Natural Resources and Environmental Protection Code, 1994 PA 451; and the 1995 amendments to Part 201 contained in [House Bill 4596]. Enactment of the Natural Resources and Environmental Protection Act resulted in new section numbers for all of the former MERA, but did not make any substantive changes in the law. [House Bill 4596] substantially amends Part 201. Those amendments, particularly the changes in cleanup standards, are reflected in this revision of Operational Memorandum #14. Unless otherwise noted, Section references in this memorandum are to Part 201 of Act 451.

This memorandum provides direction in the preparation and review of generic industrial and commercial land use remedial action plans (RAPs) to comply with Section 20120A(1)(B) and (D). The following information highlights some important aspects of generic land use cleanups:

- The preparation, review and approval of RAPs based on the generic industrial/commercial approach is anticipated to require less effort than a site-specific RAP for most sites. In general, it will not be necessary to develop site-specific cleanup criteria for those sites which can be appropriately and completely addressed with these generic criteria.
- Site-specific RAPs are also an option under Section 20120A(2). Site-specific RAPs require the development of exposure assumptions that are representative of the activities of human receptors at the site. Site-

specific direct contact cleanup criteria may be developed by appropriately adjusting the exposure assumptions in the generic algorithms. Justification must be provided for the site-specific exposure assumptions identified.

- If a RAP relies on the attached generic risk assessment algorithms and criteria, the RAP must include a statement confirming that the generic exposure assumptions are representative of, or exceed, the expected exposure of workers at the site.
- In identifying which generic cleanup criteria are appropriate for a site, primary consideration should be given to the human receptors and the kinds of activities in which they engage. Land-use specific criteria can be used for a site not typically categorized under that specific land use, as long as the exposures do not exceed those identified in the algorithm used to derive the criteria.
- These generic industrial and commercial criteria apply only to the assessment of human health risks for workers at these sites. The need for assessment of off-site human health risks will be determined based on an evaluation of exposure potential for off-site receptors.

The direction provided in this memo is intended to facilitate the preparation of RAPs by setting forth the Environmental Response Division's (ERD) expectations for the human health risk assessment assumptions which are used to generate acceptable cleanup criteria for specific land uses. Additional information about the applicability of this approach and the criteria listed in the attached tables follows.

The attached sections on the land use-specific categories explain the basis for the exposure assumptions used in the generic approaches. In general, the exposure assumptions were established to be protective for a "reasonable maximum exposure" (RME) of a worker under the scenarios established. The RME is defined as the highest exposure that is reasonably expected to occur at a site. These exposure assumptions would also be protective of other workers at the facility who are outdoors less often. If the workers at a commercial or industrial property have a greater exposure potential (e.g., the exposure duration or exposure frequency is greater than that assumed in the generic algorithms), a site-specific RAP which reflects the exposure potential at the site should be submitted. This can be done by adjusting the exposure assumptions within the generic equation.

The criteria in the attached tables have been calculated by ERD toxicologists for the convenience of parties preparing generic industrial or commercial RAPs. The criteria are not maximum allowable criteria; they are concentrations that may be allowable for exposure in certain industrial or commercial settings. Higher concentrations may be approved as part of a limited industrial/commercial RAP if exposure barriers or engineering controls prevent or limit exposure. The criteria in the tables can be used as a screening tool to determine which areas of a site may be addressed by land use restrictions alone, and which require additional remediation or control.

The values in the table are useful in determining acceptable concentrations protective of human health through exposure pathways characterized by standardized assumptions. The text of the attachment describing the

algorithms includes discussions of other human exposure pathways which may require additional consideration in exceptional circumstances (e.g., inhalation pathway if a hazardous substance present in shallow soils is a carcinogen via inhalation but not ingestion or risks from contaminated subsurface materials to construction workers). When these special circumstances exist, contact an ERD toxicologist for guidance.

**Generic Industrial and Commercial Cleanup Criteria  
Groundwater and Soil Direct Contact**

The attached tables list the generic industrial and commercial site criteria in a format similar to the table of residential criteria in Operational Memorandum #8. The applicability of values from the generic commercial and industrial tables may vary depending, for example, on site characteristics, reasonably foreseeable groundwater use, and the nature of the remedy being proposed. Additional guidance on the applicability of values from the chart follows.

**HEALTH-BASED AND AESTHETIC DRINKING WATER CRITERIA**

These criteria apply to groundwater in an aquifer. The RAP should identify whether each saturated zone underlying the site is an aquifer. Any formation which serves or may serve as a drinking water source meets the definition of "aquifer" in R 299.5101(c). Cleanup criteria for groundwater not in an aquifer must be determined by consideration of potential public health and environmental impacts associated with contamination of that groundwater (see discussion of Groundwater/Surface Water Interface Values below).

The health-based values in the attached table were calculated using the generic land use algorithms which are designed to protect workers whose drinking water is from an on-site groundwater source. If groundwater is the source of drinking water at the property, and the values in the table are exceeded, a remedial action to address groundwater will be necessary. If a state drinking water standard is available for an on-site contaminant, the drinking water standard overrides the health-based criterion and becomes the cleanup goal. In addition, if the affected groundwater is the source of drinking water at the industrial/commercial site, the aesthetic criterion (as defined by R 299.5709(2)(c) or (d)) must be met if that criterion is more restrictive than the health-based-criterion unless an assessment is presented that justifies an alternative criterion. The state drinking water standard would not, however, override a more restrictive aesthetic criterion. This assures that the groundwater will not be unusable because of aesthetic impacts. If groundwater is not the source of drinking water at the property, but it is or may be the source for off-site drinking water, then the need for remedial action to address the groundwater would be determined by other rules (e.g., R 299.5709). Groundwater beyond the property boundary would need to be addressed either by remediation or exposure controls.

Consider this example: A RAP using the generic criteria is proposed for an industrial site where groundwater is used as the source of drinking water for that facility and for private wells off-site. The groundwater concentrations on site (current and expected concentrations, based on information about migration potential developed during the Remedial Investigation and explained in the RAP) do not exceed the applicable drinking water criteria in the attached table. Remedial actions to address on-site groundwater would be

determined by the requirements of R 299.5705(5) and (6) (unless the Department makes a finding pursuant to Section 20118(5) and (6) that compliance with those subrules is not required) and/or compliance with GSI criteria. However, if hazardous substance concentrations in groundwater exceed the generic residential criteria at the industrial site boundary, groundwater remediation or exposure controls, or both, may be required to address potential off-site risks.

#### GROUNDWATER SURFACE WATER INTERFACE (GSI) CRITERIA

The GSI values included in the attached table are the same GSI values as presented in Op Memo #8. See Op Memo #8 for a complete explanation of GSI values. The GSI values are included here because they define the maximum allowable hazardous substance concentration at the groundwater surface water interface or at the edge of the mixing zone, whichever is applicable for a specific site, in industrial/commercial situations as well as residential situations. This is a function of applicable requirements of Part 31 of Act 451. Judgments about the applicability of GSI values and the compliance point for GSI criteria are the same for residential and commercial/industrial situations.

Prior to passage of the 1995 amendments, a mixing zone was not allowed when assessing the impact of groundwater venting to a surface water. A mixing zone is now allowed for venting groundwater at those sites where an additional load to the receiving stream of site-specific contaminants is allowable and where a mixing zone is appropriate for the receiving stream. If a RAP allows for venting groundwater, the discharge must comply with requirements of Part 31 of Act 451 and the relevant rules promulgated under that Part.

#### TARGET METHOD DETECTION LIMITS IN WATER AND SOIL

The values in these columns are identical to those in Operational Memorandum #8 and Operational Memorandum #6. See Op Memo #6 for a complete explanation of "target method detection limits" and analytical methodology.

#### SOIL CRITERIA PROTECTIVE OF GROUNDWATER

The determination of a soil concentration protective of groundwater in an aquifer can be more complex at industrial/commercial sites than for some residential sites, consequently, these values are not presented on the list. If groundwater contamination is confined (and will remain) on-site, and the groundwater at the site is used as a source of drinking water, then the soil cleanup criteria protective of groundwater can be determined in one of the following ways: 1) through the use of leachate test (see Operational Memorandum #12), comparing the leachate results to the industrial/commercial health-based drinking water value or aesthetic value, whichever is more restrictive, or if available, the state drinking water standard (unless the aesthetic criterion is more restrictive); 2) by comparing the concentration in soil (i.e., measured as a total, not leachable concentration) to 20 times the appropriate groundwater criterion; or 3) by the use of other methods, such as fate and transport modeling or perched in-situ groundwater evaluation, that demonstrate that hazardous substances in soil will not result in relevant groundwater criteria being exceeded. However, if off-site groundwater is or may be used as a source of drinking water, the groundwater must meet residential criteria at the property boundary or exposure controls must be provided. In that case, on-site soils may need to be cleaned up to a level more restrictive than that described above in order to assure that residential

criteria will be met at the appropriate location, unless groundwater remediation is being used to achieve the residential groundwater criteria off-site. It is possible that acceptable soil criteria protective of groundwater may vary across the site.

For certain chemicals which strongly adsorb to soil and are known not to leach at significant concentrations (i.e., PCBs, carcinogenic polynuclear aromatic hydrocarbons and some chlorinated pesticides), the direct contact value is accepted as the soil cleanup criterion to protect groundwater in addition to the protection against long-term, systemic, direct contact hazards. However, there are certain situations (i.e., presence of solvents or collection of unfiltered groundwater samples) which could result in the presence of these types of materials in groundwater. These other conditions should be evaluated before a chemical is considered nonmobile in soil. Consult an ERD toxicologist if you think direct contact values for other contaminants would be protective of groundwater or if you have questions about conditions that could cause the transport of a nonmobile contaminant through soil.

#### SOIL CRITERIA PROTECTIVE OF SURFACE WATER

The default values are shown in Op Memo #8 as 20 times the GSI value. If the GSI value is the controlling factor for groundwater and/or aquifers at an industrial/commercial site, the 20 times GSI value would be applied here in the same way it would be at a residential site. See Operational Memorandum #8 for a full discussion of this issue. Since the GSI value applies only at the groundwater surface water interface it is not necessary that soil concentrations throughout the site be less than or equal to 20 times the GSI number. However, in some cases, it may be simplest to make this comparison in judging the need for soil remediation to protect surface water. Generic industrial/commercial soil cleanup criteria protective of surface water can be developed using the same approaches that apply to the soil criteria protective of drinking water (i.e., leachate tests, 20 times water concentrations, comparison of perched water quality to GSI values or fate and transport modeling). This accounts only for leaching of hazardous substances from soil into groundwater and the subsequent impact of that groundwater on surface water. If there is significant potential for runoff to carry contaminated soil into surface water (i.e., this pathway is pertinent in the risk assessment), the impact of that runoff should be characterized in the risk assessment using fate and transport modeling. This type of analysis may be necessary in cases where the hazardous substances present at the site are highly persistent and/or bioaccumulative, since transport of substances with these properties may result in unacceptable impact on surface water sediments or in the food chain.

#### DIRECT CONTACT CRITERIA

These values protect workers at the site against long-term, systemic health effects from ingestion and dermal absorption of hazardous substances in soil. The exposure assumptions used in the algorithms are discussed in the generic industrial and commercial sections. The generic land-use direct contact criteria are applied like the residential direct contact values, except that the requirement that direct contact concentrations be met throughout the affected media will not always apply to industrial/commercial cleanups. It is possible for a generic industrial/commercial RAP to combine the application of these values for shallow soils and land use restrictions to protect against exposure to higher concentrations in deeper soils to provide for a remedy that is, when considered in total, protective of public health. In general,



surface soils are considered to be the top 0-6 inches, unless activities at a site indicate that a greater depth is more appropriate. However, unless use restriction are in place for contaminated subsurface materials, contaminant concentrations cannot exceed the appropriate soil concentration to protect public health.

Average on-site soil concentrations, represented as a 95% upper confidence level (UCL) on the arithmetic mean, may be used to determine compliance with the soil direct contact value. On-site 95% UCLs should, however, reasonably represent the areas over which exposures are expected to occur. Refer to EPA Guidance (EPA, 1992b) on appropriate methodology for calculating the 95% UCL.

#### ISSUES NOT ADDRESSED BY THE DIRECT CONTACT CRITERIA

**Inhalation:** Since all RAPs must document that they are protective of the public health, safety and welfare and the environment, they must contain some discussion of potential inhalation risks, and whether inhalation is a pertinent pathway for human exposure at the site in question. The direct contact criteria do not address and are not applicable for the inhalation pathway because they do not incorporate the potential inhalation effects, long-term or acute, of hazardous substances in soil.

In many cases, the inhalation pathway will be addressed by a simple description of the physical characteristics of the site such as pavement, vegetative cover, depth to contamination, or characteristics of on-site contaminants, which would allow for its elimination as a pertinent pathway. Characteristics of the contaminants that should be considered are vapor pressure and/or Henry's Law constant, the potential to cause cancer via the inhalation route, the potential to cause irritation of respiratory tissue and special characteristics which may make a contaminant an inhalation hazard (e.g., friable asbestos). The RAP should indicate whether any materials with these characteristics are present. If such materials are present, it may be necessary to conduct a risk assessment of the inhalation pathway, pursuant to Rules 299.5717(3)(a) and (f) in general, and to include criteria or exposure controls which are protective under the inhalation scenario. If not, criteria and/or exposure control measures which are protective for other routes of exposure will be deemed protective for the inhalation pathway and a narrative assessment for the inhalation pathway will be sufficient. EPA guidance should be followed when evaluating the inhalation pathway (EPA, 1991).

**Dermal Toxicity:** The direct contact soil equations do not address acute skin toxicity or skin sensitization. These concerns may have to be addressed before chemicals with these characteristics can be left in place at the direct contact concentration.

**Ecological Concerns:** Industrial/commercial RAPs also must address ecological concerns. The RAP should include a description of the physical setting of the site, including any natural resources which could be affected by the release(s) addressed in the plan. In general, potential ecological impacts are defined as adverse impacts on a community or a population of organisms rather than on an individual who is the focus of a human health risk assessment. An ecological risk assessment will be required only if there is a "sensitive environmental resource" (See Rule 299.5803(j)) present at or near the site, or if there are other special circumstances such as concern for persistent or bioaccumulative hazardous substances which may adversely effect the food chain, or a physical feature that would attract wildlife to the site

(e.g., migratory waterfowl habitat). Professional judgment must be used to determine whether it is likely that criteria more restrictive than those required to protect public health, or those required pursuant to other applicable regulations (e.g., groundwater/surface water interface criteria), are necessary to protect natural resources at or near the site. If ERD staff believe that there is a need for an ecological assessment, this should be reviewed with your supervisor and other technical experts as appropriate. Ecological risk assessments will be the exception rather than the rule.

#### Other Requirements for Industrial and Commercial RAPs

The generic industrial and commercial cleanup criteria will simplify the human health risk assessment component of the RAP when they are applicable. If the site meets the criteria for application of the generic approach, the human health risk assessment can consist of a comparison to the generic criteria when they are proposed for use at the site. If other criteria are proposed, they must be justified as protective of public health, safety, welfare and the environment. Regardless of whether generic or site-specific criteria are proposed, the RAP must also contain a demonstration that it satisfies all other requirements of Part 201 and the administrative rules, including applicable or relevant and appropriate requirements (ARARs) from other environmental laws. You should review Rules 299.5717, 299.5719 which contain requirements applicable specifically to industrial/commercial (formerly "Type C") cleanups. Also review Rules 299.5601 and 299.5603 which describe the factors the Department must consider in deciding whether to approve a RAP. Parties preparing industrial/commercial RAPs should directly and succinctly address how the RAP is responsive to all requirements of Rules 299.5601, 299.5603, 299.5717, and 299.5719 (or explain why the requirement is not applicable to the site).

Important components of an industrial/commercial RAP, in addition to the risk assessment, include:

- a thorough description of the proposed exposure controls (including a proposed restrictive covenant which addresses the factors called for in Rule 299.5719(3)). Exposure controls can be as simple as a commitment, through the restrictive covenant, that the land use of the site will remain consistent with the industrial or commercial risk assessment assumptions. More complex controls will be required if, for example, an engineered containment structure is part of the remedy.
- an explanation of how the proposed controls will be reliable, effective and satisfy other requirements of law.
- an operation and maintenance plan (see Rule 299.5517) and a monitoring plan (see Rule 299.5519), or both, if necessary. These plans may be conceptual (e.g., they need not specify manufacturers for equipment to be used, but must describe the function of the equipment). However, the plans must be presented in sufficient detail to allow us to judge their adequacy. The plans must also include cost estimates for implementation of the operation and maintenance and/or monitoring work. The cost estimates, which will be used, in part, to determine the amount of financial assurances required pursuant to Rule 299.5719(2), should be

based on work being done by contractor personnel rather than by employees of the party responsible for implementation of the RAP. This allows us to be confident that financial assurances would cover necessary costs if the state must take over these activities.

This memo is intended to provide guidance to Division staff to foster consistent application of Part 201 of the Natural Resources and Environmental Protection Act, 1994 PA 451 and associated Administrative Rules. This document is not intended to convey any rights to any parties nor create any duties or responsibilities under law. This document and matters addressed herein are subject to revision.

Questions about the generic industrial and commercial algorithms and criteria should be directed to ERD toxicologists (Chris Flaga, at 517-373-0160; Jeff Crum, at 517-335-3092; or Linda Larsen at 517-335-3161). Questions about other aspects of generic industrial and commercial RAPs should be directed to District Supervisors.

#### GENERIC INDUSTRIAL LAND USE CATEGORY

A generic industrial site will include sites with the following characteristics:

- The primary activity at the site is industrial in nature (e.g., manufacturing; utilities; industrial research and development; petroleum bulk storage) and access to the site is reliably restricted consistent with its use (e.g., by fences or security personnel or both). The term industrial site does not include farms, gasoline service stations or other commercial establishments where children may commonly be present. Inactive or abandoned sites are included if the property use was industrial, as described above.
- The current zoning of the property is industrial, the zoning is anticipated to be industrial (see below), or the RAP includes documentation that the current industrial use is a legal non-conforming use. This may include different zoning designations, depending on the community, such as "light industrial" or "heavy industrial".
- Documentation of zoning must be provided in the form of a map or current property record card which shows the zoning status of the site and all adjacent properties. If the RAP is based on anticipated zoning changes, discussion of this issue must indicate how and when the zoning changes are to be accomplished. The RAP must identify (preferably on a map) the nearest current residential land uses and nearest parcels which are zoned for residential use. Any non-conforming land uses in the vicinity of the site must be identified in the RAP (e.g., residential use on a parcel zoned "transitional industrial").

#### Generic Industrial Cleanup Criteria Algorithms

The following equations represent a reasonable and conservative approach for deriving generic cleanup criteria for an industrial facility. Assumptions are conservative to include a reasonable maximum exposure. The population protected are those industrial workers who spend a significant percentage of

their work time outdoors. Algorithms are presented for both the ingestion of groundwater and for direct contact with soil.

The generic industrial equations follow.

Generic Groundwater Algorithms:

CARCINOGENS: 
$$\frac{10^{-5} \times BW \times AT \times CF}{SF \times EF \times ED \times IR_{dw}}$$

where,

$10^{-5}$ cancer risk	= acceptable risk
BW (body weight)	= 70 kg
AT (averaging time in days)	= 25,550 (70 x 365)
CF (conversion factor)	= 1000 ug/mg
SF (cancer slope factor, mg/kg-d <sup>-1</sup> )	= chemical-specific
EF (exposure frequency)	= 245 d/yr
ED (exposure duration)	= 21 yr
IR <sub>dw</sub> (drinking water ingestion rate)	= 1 liter/day

NONCARCINOGENS: 
$$\frac{HQ \times RfD \times BW \times AT \times RSC \times CF}{EF \times ED \times IR_{dw}}$$

where,

HQ (hazard quotient)	= 1
RfD (oral reference dose, mg/kg/d)	= chemical-specific
BW (body weight)	= 70 kg
AT (averaging time)	= 7,665 days (21 x 365)
CF (conversion factor)	= 1000 ug/mg
RSC (relative source contribution)	= 0.2
EF (exposure frequency)	= 245 d/yr
ED (exposure duration)	= 21 yr
IR <sub>dw</sub> (drinking water ingestion rate)	= 1 liter/day
ED (exposure duration)	= 21 yr
IR <sub>dw</sub> (drinking water ingestion rate)	= 1 liter/day

These equations yield values which represent concentrations of contaminants in water in units of parts per billion (ppb) or micrograms per liter (ug/l). To convert to units of parts per million (ppm) or milligrams per liter (mg/l) in water, divide by 1,000.

The selection of an appropriate averaging time (AT) is dependent upon the type of toxic effect being evaluated. EPA guidance is followed on this issue (USEPA, 1989; USEPA, 1991). AT represents the number of days over which the exposure is averaged. When evaluating long-term exposure to noncarcinogenic compounds, exposures are calculated by averaging over the period of exposure (i.e., subchronic or chronic exposures). For carcinogenic compounds, exposures are calculated by prorating the total cumulative dose over a lifetime (also called lifetime average daily dose). The approach for carcinogens is based on the assumption that a high dose of a carcinogen received over a short period of time is equivalent to a corresponding low dose spread over a lifetime. The averaging time for carcinogens is 25,550 days (70 years x 365 days) and 7,665 days (21 years x 365 days) for noncarcinogens.

MDNR's recommendation of 21 years as the exposure duration (ED) for a worker is based on 1991 statistics from the U.S. Dept. of Labor. However, since the Dept. of Labor statistics did not detail the distribution for employees

working greater than 19 years at one location, the EPA 95th percentile estimate of 25 years was assumed. The 90th percentile was estimated to be 21 years. Although an ED of 21 years differs from EPA's recommendation of 25 years, our value represents more recent data. In addition, we follow general EPA guidance which recommends using a combination of exposure assumptions which represent 50th, 90th and 95th percentiles.

The exposure frequency (EF) for the drinking water scenario is derived assuming 260 work days per year minus 3 work weeks (15 days) of vacation and sick time. The assumed amount of water ingested at work (1 liter/day) is based on EPA's recommendation (USEPA, 1991). It is pointed out, however, that workers engaged in hard, physical labor could ingest a greater volume of water and this should be considered before finalizing the criteria to be used at a specific site.

The RSC of 0.2 (20%) assumes that a worker gets 80% of his/her exposure to on-site contaminants from other sources. The RSC represents a default value, and if chemical-specific data are available, they should be used in place of the default. Use of the RSC is consistent with the algorithms for the residential cleanup criteria. Justification for use of a RSC follows. There are many chemicals to which people are exposed through a variety of media and activities. For example, solvents, which are common industrial contaminants, are also commonly found in products routinely used by the general consumer. Ignoring exposures from other sources could underestimate the risk posed by that type of chemical. However, other chemicals may not occur at significant levels, or may not occur at all, outside of the work place. In light of the fact that chemical-specific data pertaining to this issue is extremely limited and significant exposures to certain chemicals do occur outside of the work place, it is necessary to identify a conservative default for this generic approach. As data suggesting something other than 20% becomes available, they will be incorporated into the chemical-specific criteria calculations.

An RSC is only used for groundwater criteria; it has been eliminated from the direct contact soil equations. Its use for the industrial/commercial scenario is consistent with the residential equations. A 20% RSC for groundwater criteria is consistent with the approach taken by U.S. EPA for establishing Maximum Contaminant Level goals (MCLg) for noncarcinogens (previously known as RMCLs). Twenty percent is used by EPA "as a reasonable approximation of the actual exposure and recognizes that this value may somewhat either overestimate or underestimate the actual drinking water contribution. EPA does not believe that it is appropriate to set the RMCL at 100 percent of the ADI, as drinking water is not the sole contributor to total exposure, and using 100 percent of the ADI would underestimate the other sources of exposure" (U.S. EPA, 1985). An RSC has also been incorporated into the Great Lakes Initiative risk assessment process and has been informally used by the Waste Management Division in establishing groundwater permit limits for noncarcinogens.

In those cases where a State Drinking Water Standard is available, it will replace the health-based drinking water criterion, unless a more conservative aesthetic criterion is available.

Generic Industrial Direct Contact Soil Criterion Algorithms

CARCINOGENS: 
$$\frac{10^{-5} \times BW \times AT \times CF}{SF \times (EF \times FD) \times ED \times FC \times [(IR_s \times AE_i) + (SA \times AF \times AE_d)]}$$

where,	$10^{-5}$ cancer risk	= acceptable risk
	BW (body weight)	= 70 kg
	AT (averaging time)	= 25,550 days
	CF (conversion factor)	= $1E+9$ ug/kg
	SF (cancer slope factor, $mg/kg-d^{-1}$ )	= chemical-specific
	EF (exposure frequency)	= 112 d/yr
	ED (exposure duration)	= 21 yr
	FC (fraction of soil contaminated)	= 1
	$IR_s$ (soil ingestion rate)	= 50 mg/day
	$AE_i$ (ingestion absorp. efficiency)	= (see text)
	SA (skin surface area)	= $2570 \text{ cm}^2/\text{day}$
	AF (soil adherence factor)	= $1.0 \text{ mg}/\text{cm}^2$
	$AE_d$ (dermal absorption efficiency)	= (see text)

NONCARCINOGENS: 
$$\frac{HQ \times RfD \times BW \times AT \times CF}{EF \times ED \times FC \times [(IR_s \times AE_i) + (SA \times AF \times AE_d)]}$$

where,	HQ (hazard quotient)	= 1
	RfD (oral ref. dose, $mg/kg/\text{day}$ )	= chemical-specific
	BW (body weight)	= 70 kg
	AT (averaging time)	= 7,665 days
	CF (conversion factor)	= $1E+9$ ug/kg
	EF (exposure frequency)	= 112 d/yr
	ED (exposure duration)	= 21 yr
	FC (fraction soil contam'd)	= 1
	$Ir_s$ (soil ingestion rate)	= 50 mg/day
	$Ae_i$ (ingestion absorp. efficiency)	= (see text)
	SA (skin surface area)	= $2570 \text{ cm}^2/\text{day}$
	AF (soil adherence factor)	= $1.0 \text{ mg}/\text{cm}^2$
	$AE_d$ (dermal absorption efficiency)	= (see text)

These equations yield values representative of concentrations of contaminants in soil in units of ppb or micrograms/kilogram (ug/kg). To convert to units of ppm or milligrams/kilogram (mg/kg) in soil, divide by 1,000.

The exposure frequency (EF) for the direct contact scenario was derived considering climatic factors (e.g., snow cover, frozen soil) and inclement weather conditions (e.g., rain) as well as variation in daily activities in which industrial workers participate. It is assumed that Michigan winters last for 4 months (120 days) making soil unavailable for contact. Allowing three weeks off for vacations and sick leave, and adjusting for a standard five day work week yields a maximum number of 160 days per year of industrial outdoor exposure in Michigan. The assumptions represent high-end values within a range of potential exposures.

$$365 - 120 - 21 \times 5/7 = 160$$

Data from the Air Quality Division indicate that, on average, precipitation exceeds 0.25 inch one day per week during the months of March through October. These data represent average values from a 30 year period, 1951 through 1980. It is assumed that rainfall which exceeds 0.25 inches makes working outdoors difficult. Incorporating this factor also assumes that this significant rainfall occurs during the work week and during the eight hour work shift, which may not always be the case. However, this assumption may be balanced or "corrected" by a few low temperature days or snow days in March or October which could prevent a worker from working outdoors. This factor results in the number of days per week which a worker comes into contact with soil to be reduced from 5 to 4.

Activity patterns of a reasonable maximum exposed worker are not likely to bring the individual into contact with bare soil each and every day, since many different duties may be performed at any given facility. As a conservative estimate, it is assumed that one half day per week is spent performing some activity which does not bring the worker into contact with bare site soil. The incorporation of this factor results in a reasonable maximum EF value of 3.5 days per week or 112 days per year.

$$160 \times 3.5/5 = 112$$

The soil ingestion rate recommended by MDNR is 50 mg/day, which follows EPA's recommendation for industrial/commercial workers.

The oral absorption efficiency default is assumed to be 100% for volatiles and 50% for semi- and nonvolatile chemicals. When chemical-specific data are available, they will be used in place of the defaults. This policy is consistent with the Type B algorithms.

The skin surface area was estimated in the following manner:

skin surface area (cm <sup>2</sup> ) = u SA forearms	= 1140
u SA face (1/2 head)	= 590
u SA hands	= 840
	<hr/>
	2570

The amount of exposed skin surface area identified represents an average scenario, realizing that at times a worker could have more or less skin exposed. For example, there may be times when a worker is working without a shirt and times when a worker may be working in a long-sleeved shirt and/or a coat. The average scenario assumes that a worker is working in a short-sleeved shirt and long pants with hair or a hat covering part of his/her head. This scenario estimates a skin surface area value of 2,570 cm<sup>2</sup>/day. In addition to the above discussion, surface area is strongly correlated with body weight. Since the assumed body weight represents an average value, surface area should be represented by an average value as well.

The attenuation factor of 1.0 mg/cm<sup>2</sup> is the value recommended by EPA (EPA, 1991). After evaluating the available soil adherence studies, EPA concludes that all of the studies considered have uncertainties thereby making a recommendation difficult. The studies provide a possible range from 0.2 to 1.5 mg/cm<sup>2</sup>. A conservative central value of 1.0 mg/cm<sup>2</sup> is recommended until better data are available.

The dermal absorption efficiency is assumed to be 10% for volatiles and 1% for semi- and nonvolatiles as assumed in the Type B algorithm. All absorption values represent defaults which will be replaced if chemical-specific data are or become available.

As indicated earlier, EPA provides general guidance on how to characterize exposures and risks when conducting risk assessments. For Superfund exposure assessments, intake and exposure values should be selected so that the combination of all variables results in an estimate of the reasonable maximum exposure (RME) for that pathway. The RME is the maximum exposure that is reasonably expected to occur at a site. Under this approach, some intake variables may not be at their individual maximum values, but when in combination with other variables, will result in estimates of the RME (USEPA, 1989). More recent EPA guidance (USEPA, 1992), recommends estimating the high end exposure by "...identifying the most sensitive parameters and using maximum or near-maximum values for one or a few of these variables, leaving others at their mean values". This guidance applies when only limited information on the distribution of the exposure or dose factors is available. The basis for this recommendation is that maximizing all variables will result in an estimate that is above the range of actual values seen in the population. The algorithms presented in this document follow EPA guidance by combining exposure assumptions which represent a mix of high-end and mid-range values. For example, when evaluating the direct contact equation, a 70 year life span, body weight and surface area all represent a 50th percentile, while the exposure duration of 21 years and the soil ingestion rate represent the 90th percentile.

Since no distributions exist for frequency of exposure to soil, it's difficult to estimate a value and its associated percentile. However, it's reasonable to assume that the value chosen (112 days) is representative of the higher end of the range of possible exposures. Data supporting the dermal contact rate is also lacking, making it difficult to estimate the percentile that it represents. Although we are using average skin surface area values as presented by EPA (USEPA, 1990), estimation of those areas which are exposed to soil is strictly based upon best professional judgment. Although a significant amount of uncertainty surrounds the estimated exposure frequency and the dermal contact rate, the exposure assumptions selected are reasonable and conservative for the purpose of developing state-wide, generic cleanup criteria for industrial facilities.



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#### GENERIC COMMERCIAL LAND USE CATEGORY

The commercial land use category is extremely varied and broad, encompassing everything from day care centers and schools to gas stations and warehouse operations. The physical setting of commercial properties and the activities which workers and the general public engage in at these sites are also extremely variable. Given the breadth of the commercial land use category, it is impossible to assign a single set of "typical" or generic exposure assumptions to characterize the activities of all potentially exposed populations.

In order to facilitate the development of generic commercial criteria, the universe of commercial land uses has been divided into four subcategories based on factors which are critical to the assessment of potential risk. These factors include the potentially exposed populations (workers or general public) and the nature, duration, and frequency of the exposures likely to occur when people occupy, work at, visit, or patronize the site. The division of the commercial land use category into subcategories allows for some useful generalizations to be made.

A substantial degree of variability remains even within the subcategories of commercial land use. It will be the responsibility of the party proposing a remedy to demonstrate that the site and exposure setting is consistent with the characteristics of the subcategory closely enough to warrant use of the criteria. Similarly, the party proposing the remedy will have to describe in the RAP those measures that will be put in place (institutional controls, restrictive covenants, access restrictions, etc.) to assure that the exposure setting of the site is maintained consistent with the exposure characteristics of the subcategory. This will serve to guarantee that uses of the site which might yield unacceptable exposures will be precluded in the future. Conversely, land uses consistent with a subcategory may not possess exposures that are similar to those used to define the category. Proper characterization of those site-specific activities or exposures may warrant the use of generic criteria from another subcategory or category.

In the following sections, exposure assumptions protective for the set of site and exposure characteristics described below for subcategory III and IV sites have been developed. Some commercial subcategory III and IV sites may be located in or near residential areas and, therefore, may be used by other populations for purposes other than the intended commercial use (e.g. recreational). It may be inappropriate to apply the generic criteria developed for a given subcategory of commercial land use, if anticipated exposure from unintended uses exceeds the exposures assumed under that subcategory. Adjustments can be made to the exposure assumptions to represent these other uses or criteria for a more representative category can be used. Alternatively, the RAP may denote measures designed to preclude unintended uses.

For the purpose of determining if the generic commercial criteria presented in this memorandum are applicable, the party proposing a remedy must first determine that the site falls within the definition of commercial land use or that the site-related exposures are similar to those assumed for this category. The definition of commercial land use includes the following two elements:

- The primary activity at the site is commercial in nature (e.g., retail; warehouse; office/business space, etc.). This could include abandoned or inactive commercial facilities as long as they fit both the definition of a commercial facility and one of the subcategory definitions described below.
- The current zoning of the property is commercial, future zoning is anticipated to be commercial, or the RAP includes documentation that the current commercial use is a legal non-conforming use. This may include different zoning designations, depending on the community, such as "community commercial", "regional commercial", "retail", or "office-business". Documentation of zoning must be provided in the form of a map or current property record card which shows the zoning status of the site and all adjacent properties. If the RAP is based on anticipated zoning changes, discussion of this issue must indicate how and when the zoning changes are to be accomplished. The RAP must identify (preferably on a map) the nearest current residential land uses and nearest parcels which are zoned for residential use. Any non-conforming land uses in the vicinity of the site must be identified in the RAP (e.g., residential use on a parcel zoned "transitional commercial").

Caution should be used when categorizing sites on the basis of facility or business type. We expect that activities may vary considerably even among facilities of the same type. Activities and exposures should be the primary considerations when determining a land use category for a specific site.

If the site meets the definition of commercial land use, the party proposing the remedy must determine which of the four subcategories of commercial land use defined below is most representative of the exposure setting of the subject site. The subcategories and the features which define them are described below:

Subcategory I: This commercial land use subcategory is characterized by any use which is intended to house, educate, or provide care for children, the elderly, the infirm, or other sensitive subpopulations. The activities engaged in by these populations at the site are characterized by exposures of relatively significant duration and/or frequency approximating the magnitude of exposures used to develop the residential criteria. The site setting may include unpaved or landscaped areas containing contaminated surficial soils which may be frequented by potentially exposed populations (e.g. play areas). Any soil contaminants present may therefore be readily accessible to the resident populations. If relied on for drinking water, exposure to groundwater would also be significant. In addition, this subcategory of commercial land use is usually, but not always, located in or near residential areas and, therefore, may be used by other populations for purposes other than the intended commercial use (e.g. recreational). This subcategory could include, but is not limited to, the following uses:

- day care centers
- any form of educational facility
- hospitals, elder care facilities, and nursing homes.

Although a site-specific risk assessment may be conducted on sites within this category, no generic commercial cleanup criteria will be developed because in

most cases, the site setting and uses will warrant the application of residential criteria. There are forms of subcategory I commercial land uses that do not possess the exposure characteristics of the residential exposure setting, for example, long-term or convalescent care facilities where patients are not expected to come into contact with soils on a frequent basis. In such cases, site-specific cleanup criteria or criteria from another subcategory can be utilized with proper justification.

**Subcategory II:** This commercial land use subcategory is characterized by the following features. Access to the public is reliably restricted, consistent with its use, by fences, security, or both. Affected surficial soils are located in unpaved or landscaped areas that are frequently contacted by worker populations such as groundskeepers, maintenance workers, or other employees whose primary duties are performed outdoors. If site groundwater is relied on for drinking water, worker populations would receive half of their total exposure from on site drinking water.

This subcategory could include, but is not limited to, the following uses:

- large-scale commercial warehouse operations
- wholesale lumber yards
- building supply warehouses

The degree of exposure for such employees under Subcategory II property is assumed to be equivalent to the exposures used to model outdoor activities in the development of the generic industrial criteria. As a result, a unique set of generic criteria has not been defined for this subcategory of commercial land use. Sites which fall into this subcategory should be addressed through the application of the generic industrial criteria or through a site-specific risk assessment.

**Subcategory III:** A subcategory III commercial site is characterized by the following features. Access to the public is unrestricted, however, the general public's occupancy of the site is expected to be intermittent and significantly less in frequency and duration relative to the population working at the site. Although some of the activities for both worker populations and the general public at a subcategory III commercial site are conducted indoors, a significant component of their activity will likely be outdoors. Affected surficial soils are located in unpaved or landscaped areas that may be contacted frequently, primarily by the worker populations (as may be the cases at gas stations, auto dealerships or building supply warehouses with unpaved or landscaped areas). If site groundwater is relied on for drinking water, worker populations would receive about half of their total exposure from the site.

This subcategory could include, but is not limited to, the following uses:

- Retail gas stations
- Auto service stations
- Auto dealerships
- Retail warehouses selling the majority of their merchandise indoors but including some limited storage or stockpiling of materials in a rear yard (building supply, retail flower and garden shops not involving on site plant horticulture and excluding open air nurseries, tree farms and sod farms which would fall into an agricultural land use).

- Repair and service establishments including but not limited to, lawn mower, boat, snowmobile, or small appliance repair shops that have small outdoor yards.
- Small warehouse operations

**Subcategory IV:** A subcategory IV commercial site is characterized by the following features. Access to the public is unrestricted, however, the general public's occupancy of the site is intermittent in frequency and of short duration relative to the worker populations resident at the site (i.e. the frequency and duration of general public occupancy at the site is typified by the time necessary to transact business at a retail establishment or to receive personal services). The predominant activities performed by both workers and the general public at this type of commercial property are conducted indoors. Affected surficial soils are located in unpaved or landscaped areas that are contacted by worker populations on an occasional basis, such as outdoor break or eating areas. General public contact with these areas is anticipated to be significantly less than the worker's contact, both in terms of frequency and duration. If site groundwater is relied on for drinking water, worker populations would receive one-half of their total exposure at the site.

This subcategory could include, but is not limited to, the following uses:

- Professional offices (lawyers, architects, engineers, real estate, insurance, etc.)
- Medical/dental offices and clinics (not including hospitals)
- Banks, credit unions, savings and loan institutions, etc.
- Publicly owned office buildings
- Any retail business whose principal activity is the sale of food or merchandise within an enclosed building
- Personal service establishments which perform services indoors (health clubs, barber/beauty salons, mortuaries, photographic studios, etc.).

#### Generic Commercial Cleanup Criteria Algorithms

The following section provides justification for the exposure assumptions used under the generic commercial subcategories III and IV. The methods used to establish the generic commercial cleanup criteria for commercial subcategories III and IV are briefly summarized below.

**Groundwater:** The worker population was used to establish exposure parameters for the generic commercial groundwater criteria. Because workers are expected to spend the most time on site, their exposures are assumed to be greater than exposures to the general public. Protection of the more highly exposed population assures protection of the general public.

Unlike soil exposures, the exposure assumptions which serve as the basis for the generic groundwater criteria were not varied between subcategories (except for subcategory I which assumes the ingestion of 2 liters of water/day). No meaningful distinctions could be made between commercial land use subcategories and water ingestion rates. The exposure assumptions and the resulting groundwater criteria do not differ from those developed for the generic industrial scenario. Please refer to the narrative on groundwater

exposure assumptions in the generic industrial section for details. When available, State Drinking Water Standards serve as the ultimate drinking water criterion, unless a more restrictive aesthetic cleanup criterion is available.

Soil: The exposure assumptions used in the direct contact algorithms are protective for a "reasonable maximum exposure". The focus was the worker population within each subcategory that spends the largest amount of time outdoors engaged in activities that permit contact with affected soils. The worker population in both commercial subcategory III and subcategory IV represents the segment of the population within the subcategory with the highest potential exposures. Protection of less significantly exposed populations, like customers or workers who spend less time outdoors, is thereby assured.

#### Generic Commercial Direct Contact Soil Algorithm

The direct contact soil algorithm for the commercial scenario is the same as the industrial direct contact soil algorithm with the exception of different values for two exposure parameters, specifically, exposure frequency (EF) and the skin surface area (SA), and incorporation of an exposure time parameter. Please refer to the generic industrial section for details on the exposure assumptions that have not changed.

$$\text{CARCINOGENS:} \quad \frac{10^{-5} \times \text{BW} \times \text{AT} \times \text{CF}}{\text{SF} \times (\text{EF} \times \text{FD}) \times \text{ED} \times \text{FC} \times [(\text{IR}_s \times \text{AE}_i) + (\text{SA} \times \text{AF} \times \text{AE}_d)]}$$

where,	$10^{-5}$ cancer risk	= acceptable risk
	BW (body weight)	= 70 kg
	AT (averaging time)	= 25,550 days
	CF (conversion factor)	= $1\text{E}+9$ ug/kg
	SF (cancer slope factor, $\text{mg/kg-d}^{-1}$ )	= chemical-specific
	EF (exposure frequency)	= (see text)
	FD (exposure duration of work day)	= (see text)
	ED (exposure duration)	= 21 yr
	FC (fraction of soil contaminated)	= 1
	$\text{IR}_s$ (soil ingestion rate)	= 50 mg/day
	$\text{AE}_i$ (ingest. absorption efficiency)	= (see text)
	SA (skin surface area)	= (see text)
	AF (soil adherence factor)	= $1.0 \text{ mg/cm}^2$
	$\text{AE}_d$ (dermal absorption efficiency)	= (see text)

$$\text{NONCARCINOGENS:} \quad \frac{\text{HQ} \times \text{RfD} \times \text{BW} \times \text{AT} \times \text{CF}}{(\text{EF} \times \text{FD}) \times \text{ED} \times \text{FC} \times [(\text{IR}_s \times \text{AE}_i) + (\text{SA} \times \text{AF} \times \text{AE}_d)]}$$

where,	HQ (hazard quotient)	= 1
	RfD (oral reference dose, $\text{mg/kg day}$ )	= chemical specific
	BW	= 70 kg
	AT	= 7,665 days
	CF	= $1\text{E}+9$ ug/kg
	EF	= (see text)
	FD	= 21 yr
	ED	= (see text)
	FC (fraction soil contam'd)	= 1

Ir <sub>s</sub>	= 50 mg/day
AE <sub>i</sub>	= (see text)
SA	= (see text)
AF	= 1.0 mg/cm <sup>2</sup>
AE <sub>d</sub>	= (see text)

These equations yield values which represent concentrations of contaminants in soil in units of ppm or mg/kg. To convert to units of ppb or micrograms/kilogram in soil (ug/kg), multiply by 1,000.

#### Commercial Subcategory III

A typical receptor in this subcategory is a gas station attendant who must perform a combination of indoor and outdoor activities. The EF of 160 days/year was derived assuming that four months of winter would preclude an individual from coming into contact with soil. Rain and other inclement weather factors were not considered because it is assumed that this type of worker must still perform his/her outdoor duties. Allowing for three weeks off per year for vacations and sick leave and adjusting for a standard five day work week yields a maximum number of 160 days per year of potential exposure (i.e.,  $365 - 120 - 21 \times 5/7 = 160$ ). Having both indoor and outdoor responsibilities, this type of commercial worker is conservatively expected to spend four out of eight hours per work day outdoors. The FD parameter is equal to 0.5 (4/8 hours).

The area of skin exposed is assumed to be the same as for the generic industrial worker, 2570 cm<sup>2</sup>/day. This assumes that the face, hands and forearms of the receptor are available for exposure, typified by a worker wearing a short-sleeved shirt and long pants.

#### Commercial Subcategory IV

The typical worker in this subcategory may be represented by an office worker who eats lunch and takes breaks outdoors. The EF was derived assuming that four months of winter would preclude an individual from coming into contact with soil. Allowing three weeks off for vacations and sick leave and adjusting for a standard five day work week yields 160 days/year. As in the generic industrial scenario, it is also assumed that it rains one day out of the week. This results in a value of 128 days/year. Since this type of receptor is outdoors only a small portion of the work day, reasonably 1.5 hours/day, a fraction of day parameter (FD) (1.5 hours out of 8) is incorporated into the algorithm. FD is equal to 0.19 (1.5/8).

This type of receptor is assumed to be a person with face, hands, forearms and lower legs exposed. This represents an individual wearing a short-sleeved shirt and a dress or skirt. The total skin surface area for these exposed areas is 4575 cm<sup>2</sup>/day.

The assumed EF, FD, and SA values for the two commercial subcategories are summarized as follows:

	<u>Exposure Frequency</u>	<u>Fraction of Day</u>	<u>Surface Area</u>
Commercial Subcat. III	160	0.50	2570
Commercial Subcat. IV	128	0.19	4575

Attached as a table is a matrix presenting all commercial category and subcategory definitions and exposure assumptions. Use this table when trying to determine the most appropriate commercial land use subcategory for the site in question.

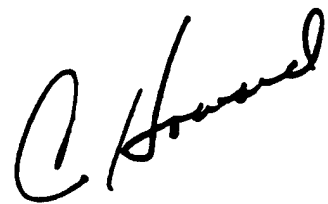




Table 1. Definitions of industrial and commercial categories and commercial subcategories and associated exposure assumptions.

LAND USE CATEGORIES AND SUBCATEGORIES	EXPOSURE ASSUMPTIONS				
	Exposure Frequency (d/year)	Fraction of Day (unitless)	Exposure Duration (years)	Soil Ingestion Rate (mg/day)	Skin Surface Area (cm <sup>2</sup> /day)
<b>INDUSTRIAL</b> primary activity is industrial; property has landscaped and/or unpaved areas maintained by employees on a regular basis or employees are present whose primary duties are performed outdoors; access to general public is restricted; zoning is industrial	≤112	≤1	≤21	≤50	≤2570
<b>COMMERCIAL</b> primary activity is commercial; access is unrestricted; zoning is commercial; see subcategories					
<b>SUBCATEGORY I</b> a property where children, the elderly, the infirm or other sensitive subpopulations are housed, educated or otherwise cared for, e.g., schools, nursing homes, day cares; residential cleanup required	≤365	≤1	≤70	≤90	varies for different age grps.
<b>SUBCATEGORY II</b> activities similar to those characterized in industrial category; industrial cleanup required	≤112	≤1	≤21	≤50	≤2570
<b>SUBCATEGORY III</b> property has landscaped or unpaved areas in which some employees will spend approximately half of their work time, e.g., gas station attendants	≤160	≤0.5	≤21	≤50	≤2570
<b>SUBCATEGORY IV</b> a property with unpaved or landscaped areas that will be frequented by employees on an occasional basis, e.g., outdoor eating areas	≤128	≤0.19	≤21	≤50	≤4575

# GENERIC INDUSTRIAL AND COMMERCIAL CLEANUP CRITERIA FOR GROUNDWATER AND SOIL

(REVISION 2)

These criteria were calculated using currently available toxicological data. Criteria may change as new toxicity data become available. They are not necessarily final cleanup standards. The determination of a soil concentration protective of surface water and/or groundwater in an aquifer is more complex than for residential sites, consequently, there are no values shown on the list. PLEASE READ THE ATTACHED OPERATIONAL MEMORANDUM FOR DETAILS. Carcinogenic chemicals are shown in bold italics. All values are expressed in units of parts per billion (ppb); ug/l in water and ug/kg in soil. (Values are converted from units of parts per million (ppm) as generated by algorithms). Scientific notation is represented by E+ or E- a value, for example  $2 \times 10^6$  is reported as 2E+6. Please refer to Operational Memorandum #6 and #8 for information concerning method detection limits and residential cleanup criteria, respectively.

Chemical	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	Direct Contact Value			Target Method Detection Limit in Soil
					Industrial	Commercial Subcategory III	Commercial Subcategory IV	
Acenaphthene	3,800	NA	3.8	5	8.1E+8	1.0E+9 (G)	1.0E+9 (G)	330
Acenaphthylene	75	NA	(B)	5	1.6E+7	2.3E+7	5.4E+7	330
Acetaldehyde	2,700	NA	(B)	500	9.7E+7	1.4E+8	2.7E+8	2,500
Acetic acid	12,000	NA	(B)	18,000	4.2E+8	5.9E+8	1.0E+9 (G)	9.0E+5
Acetone	2,100	NA	25,000	100	7.4E+7	1.0E+8	2.1E+8	100
Acetonitrile	400	NA	810	50	1.4E+7	2.0E+7	3.9E+7	100
Acrolein	330	NA	2.5	5	1.2E+7	1.7E+7	3.3E+7	10
<b>Acrylamide</b>	0.78	NA	9.1	0.5	33,000	47,000	1.1E+5	5
Acrylic acid	11,000	NA	(B)	NA	3.9E+8	5.5E+8	1.0E+9 (G)	NA
<b>Acrylonitrile</b>	6.4	NA	2.2	1	48,000	64,000	1.3E+5	10
<b>Alechlor</b>	2 (C)	NA	48	1	1.9E+8	2.6E+8	6.2E+8	20
Aldicarb	3 (C)	NA	(B)	2	4.5E+6	6.3E+6	1.5E+7	50
Aldicarb sulfoxide	4 (C)	NA	(B)	2	5.9E+6	8.2E+6	1.9E+7	50
Aldicarb sulfone	2 (C)	NA	(B)	2	5.0E+6	7.0E+6	1.6E+7	50
<b>Aldrin</b>	0.2	NA	0.0014	0.01	8,800	12,000	29,000	20
Aluminum	ID	50 (A,F)	(B)	100	ID	ID	ID	700
Ammonia	ID (P)	NA	20 (D)	50	ID (P)	ID (P)	ID (P)	1,000
<b>Aniline</b>	610	NA	4	20	2.6E+7	3.7E+7	8.7E+7	1,700
Anthracene	21,000	NA	1.1E+5	5	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	330
Antimony	6 (A,C)	NA	50 (A)	5	1.6E+6	2.2E+6	5.2E+6	500
<b>Arsenic</b>	50 (A,C)	NA	11 (A)	5	83,000	1.2E+5	2.8E+5	100
<b>Atrazine</b>	3 (C)	NA	7.8	1	6.8E+5	9.5E+5	2.3E+6	50
<b>Azobenzene</b>	32	NA	(B)	NA	1.4E+6	1.9E+6	4.5E+6	NA
Barium	2,000 (A,C)	NA	630 (A,D)	200	3.2E+8	4.4E+8	1.0E+9 (G)	1,000
<b>Benzene</b>	5 (C)	NA	53	5	8.5E+5	1.2E+6	2.4E+6	10

# GENERIC INDUSTRIAL AND COMMERCIAL CLEANUP CRITERIA

REVISION 2

Chemical	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	Direct Contact Value			Target Method Detection Limit in Soil
					Industrial	Commercial Subcategory III	Commercial Subcategory IV	
<b>Benzidine</b>	0.015	NA	0.0054	50	650	910	2,200	1,000
<b>Benzo(a)anthracene (Q)</b>	4.8	NA	0.31	5	2.1E+5	2.9E+5	6.8E+5	330
<b>Benzo(b)fluoranthene (Q)</b>	4.8	NA	0.31	5	2.1E+5	2.9E+5	6.8E+5	330
<b>Benzo(k)fluoranthene (Q)</b>	48	NA	0.31	5	2.1E+6	2.9E+6	6.8E+6	330
<b>Benzo(g,h,i)perylene</b>	75	NA	(B)	5	1.6E+7	2.3E+7	5.4E+7	330
<b>Benzo(a)pyrene (Q)</b>	0.2 (C)	NA	0.31	5	21,000	29,000	68,000	330
<b>Benzoic acid</b>	92,000	NA	(B)	50	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	3,300
<b>Benzyl alcohol</b>	29,000	NA	22	50	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	1,300
<b>Benzyl chloride</b>	20	NA	(B)	0.5	1.5E+5	2.0E+5	4.1E+5	200
<b>Beryllium</b>	4 (C)	NA	(B)	1	35,000	49,000	1.2E+5	200
<b>Bis(2-chloroethoxy)ethane</b>	ID	NA	(B)	5	ID	ID	ID	330
<b>bis(2-Chloroethyl)ether</b>	3.2	NA	4.2	5	23,000	32,000	63,000	330
<b>bis(2-Ethylhexyl)phthalate</b>	6 (C)	NA	59	5	1.1E+7	1.5E+7	3.5E+7	330
<b>Boron</b>	1,300 (A)	NA	(B)	300	2.7E+8	3.8E+8	8.9E+8	8,000
<b>Bromobenzene</b>	ID	NA	(B)	1	ID	ID	ID	10
<b>Bromodichloromethane</b>	100 (C,S)	NA	24	1	4.0E+5	5.6E+5	1.1E+6	10
<b>Bromoform</b>	100 (C,S)	NA	65	1	3.1E+6	4.4E+6	8.7E+6	10
<b>Bromomethane</b>	29	NA	11	1	1.0E+6	1.5E+6	2.9E+6	10
<b>n-Butanol</b>	2,700	NA	(B)	800	9.7E+7	1.4E+8	2.7E+8	4,400
<b>2-Butanone (MEK)</b>	38,000	NA	7,200	50	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	100
<b>n-Butyl acetate</b>	1,600	NA	40	10	5.7E+7	7.9E+7	1.6E+8	20
<b>t-Butyl alcohol</b>	11,000	NA	8,300	1,000	4.0E+8	5.6E+8	1.0E+9 (G)	4,400
<b>Butyl benzyl phthalate</b>	3,300	NA	(B)	5	7.2E+8	1.0E+9 (G)	1.0E+9 (G)	330
<b>Cadmium</b>	5 (A,C)	NA	0.64 (A,D)	0.5	2.3E+6	3.2E+6	7.4E+6	50
<b>Camphene</b>	ID	NA	(B)	NA	ID	ID	ID	NA
<b>Caprolactam</b>	17,000	NA	(B)	NA	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	NA
<b>Carbaryl</b>	2,000	NA	(B)	20	4.3E+8	6.1E+8	1.0E+9 (G)	1,000
<b>Carbofuran</b>	40 (C)	NA	1.6	20	3.7E+6	5.2E+6	1.0E+7	200
<b>Carbon disulfide (R)</b>	2,300	NA	(B)	50	8.2E+7	1.1E+8	2.3E+8	100
<b>Carbon tetrachloride</b>	5 (C)	NA	21	1	1.9E+5	2.7E+5	5.3E+5	10
<b>Chlordane</b>	2 (C)	NA	0.00053	0.02	1.2E+5	1.6E+5	3.8E+5	10
<b>Chloride</b>	ID	2.5E+5	(B)	10,000	ID	ID	ID	2.0E+5
<b>Chlorobenzene</b>	100 (C)	NA	71	1	1.4E+7	2.0E+7	3.9E+7	10
<b>Chloroethane</b>	910	NA	(B)	1	6.5E+6	9.1E+6	1.8E+7	10
<b>2-Chloroethyl vinyl ether</b>	ID	NA	(B)	10	ID	ID	ID	100
<b>Chloroform</b>	100 (C,S)	NA	80	1	4.1E+6	5.7E+6	1.1E+7	10
<b>Chloromethane</b>	270	NA	(B)	1	1.9E+6	2.7E+6	5.3E+6	10
<b>4-Chloro-3-methylphenol</b>	420	NA	4.4	5	1.5E+7	2.1E+7	4.1E+7	330
<b>beta-Chloronaphthalene</b>	5,200	NA	(B)	5	1.9E+8	2.6E+8	5.2E+8	330

GENERIC INDUSTRIAL AND COMMERCIAL CLEANUP CRITERIA

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Chemical	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	Direct Contact Value			Target Method Detection Limit in Soil
					Industrial	Commercial Subcategory III	Commercial Subcategory IV	
2-Chlorophenol	130	NA	10	5	4.6E+6	6.5E+6	1.3E+7	330
o-Chlorotoluene	420	NA	{B}	1	1.5E+7	2.1E+7	4.1E+7	10
Chlorpyrifos	63	NA	0.002	0.2	1.4E+7	1.9E+7	4.5E+7	10
Chromium (III) (I)	100 {A,C,J}	NA	77 {A,D}	50	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	2,500
Chromium (VI) (I)	100 {A,C,J}	NA	7.3 {A}	5	2.2E+7	3.0E+7	7.1E+7	200
Chrysene (Q)	480	NA	0.31	5	2.1E+7	2.9E+7	6.8E+7	330
Cobalt	100	NA	{B}	10	2.3E+7	3.2E+7	7.4E+7	500
Copper	4,000 {A}	1,000	18 {A,D}	25	1.7E+8	2.4E+8	5.6E+8	1,000
Cyanazine	6	NA	4.7	10	2.6E+5	3.6E+5	8.5E+5	500
Cyanide (R)	200 (C)	NA	5.2	20	9.9E+7	1.4E+8	3.3E+8	500
Cyclohexanone	94,000	NA	{B}	50	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	100
Dacthal	210	NA	{B}	1	4.5E+7	6.3E+7	1.5E+8	20
Dalapon	200 (C)	NA	{B}	10	6.3E+7	8.8E+7	1.8E+8	100
4,4'-DDD	14	NA	0.0084	0.02	6.3E+5	8.8E+5	2.1E+6	20
4,4'-DDE	10	NA	0.0059	0.02	4.4E+5	6.2E+5	1.5E+6	20
4,4'-DDT	10	NA	0.00023	0.02	4.4E+5	6.2E+5	1.5E+6	20
Decabromodiphenyl ether	200	NA	{B}	10	4.5E+7	6.3E+7	1.5E+8	100
Di-n-butyl phthalate	2,500	NA	12,000	5	5.4E+8	7.6E+8	1.0E+9 (G)	330
Di(2-ethylhexyl) adipate	400 (C)	NA	{B}	5	2.1E+7	2.9E+7	5.8E+7	330
Di-n-octyl phthalate	380	NA	{B}	5	8.1E+7	1.1E+8	2.7E+8	330
Diacetone alcohol	ID	NA	{B}	NA	ID	ID	ID	NA
Diazinon	3.8	NA	0.002	0.5	8.1E+5	1.1E+6	2.7E+6	10
Dibenzo(a,h)anthracene (Q)	0.48	NA	0.31	5	21,000	29,000	68,000	330
Dibenzofuran	ID	NA	{B}	5	ID	ID	ID	330
Dibromochloromethane	100 (C,S)	NA	29	1	3.0E+5	4.1E+5	8.2E+5	10
Dibromomethane	230	NA	{B}	5	5.0E+7	6.9E+7	1.6E+8	10
1,2-Dichlorobenzene	600 (C)	NA	7	1	6.4E+7	9.0E+7	1.8E+8	10
1,3-Dichlorobenzene	600 (C)	NA	180	1	6.4E+7	9.0E+7	1.8E+8	10
1,4-Dichlorobenzene	75 (C)	NA	15	1	1.0E+6	1.4E+6	2.9E+6	10
3,3'-Dichlorobenzidine	7.7	NA	0.063	20	55,000	77,000	1.5E+5	2,000
Dichlorodifluoromethane	4,800	NA	{B}	1	1.7E+8	2.4E+8	4.8E+8	10
1,1-Dichloroethane	2,500	NA	{B}	1	8.9E+7	1.3E+8	2.5E+8	10
1,2-Dichloroethane	5 (C)	NA	560	1	2.7E+5	3.8E+5	7.6E+5	10
1,1-Dichloroethylene	7 (C)	NA	32	1	7.4E+5	1.0E+6	2.1E+6	10
cis-1,2-Dichloroethylene	70 (C)	NA	{B}	1	8.2E+6	1.1E+7	2.3E+7	10
trans-1,2-Dichloroethylene	100 (C)	NA	300	1	1.3E+7	1.8E+7	3.5E+7	10
2,6-Dichloro-4-nitroaniline	6,300	NA	{B}	0.01	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	0.1
2,4-Dichlorophenol	210	NA	34 (D)	5	4.5E+7	6.3E+7	1.5E+8	330
2,4-Dichlorophenoxyacetic acid	70 (C)	NA	47	10	4.5E+7	6.3E+7	1.5E+8	200

# GENERIC INDUSTRIAL AND COMMERCIAL CLEANUP CRITERIA

REVISION 2

Chemical	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	Direct Contact Value			Target Method Detect Limit in Soil
					Industrial	Commercial Subcategory III	Commercial Subcategory IV	
1,2-Dichloropropane	5 (C)	NA	64	1	3.6E+5	5.1E+5	1.0E+6	10
1,3-Dichloropropane (J)	19	NA	3	1	1.4E+5	1.9E+5	3.8E+5	10
Dichloroethane	12	NA	(B)	0.1	5.2E+5	7.2E+5	1.7E+6	50
Dicyclohexyl phthalate	ID	NA	(B)	5	ID	ID	ID	330
Dieldrin	0.22	NA	3.2E-5	0.02	9,400	13,000	31,000	20
Diethoxymethane	ID	NA	(B)	10	ID	ID	ID	100
Diethyl ether	10,000	NA	(B)	50	3.7E+8	5.2E+8	1.0E+9 (G)	100
Diethyl phthalate	16,000	NA	1.2E+5	5	1.0E+8 (G)	1.0E+9 (G)	1.0E+9 (G)	330
Diethylene glycol monobutyl ether	250	NA	(B)	NA	5.4E+7	7.6E+7	1.8E+8	NA
Dilaopropylamine	16	NA	(B)	NA	5.7E+5	8.0E+5	1.6E+6	NA
Dimethyl phthalate	2.1E+5	NA	2.9E+6	5	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	330
N,N-Dimethylacetamide	520	NA	(B)	NA	1.9E+7	2.6E+7	5.2E+7	NA
N,N-Dimethylaniline	46	NA	(B)	NA	1.6E+6	2.3E+6	4.6E+6	NA
Dimethylformamide	2,000	NA	3,800	NA	7.1E+7	1.0E+8	2.0E+8	NA
2,4-Dimethylphenol	1,000	NA	31	5	2.3E+8	3.2E+8	7.4E+8	330
2,6-Dimethylphenol	13	NA	(B)	5	2.7E+8	3.8E+8	8.9E+8	330
3,4-Dimethylphenol	29	NA	(B)	5	6.3E+8	8.8E+8	2.1E+7	330
Dimethylsulfide	6.3E+5	NA	(B)	NA	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	NA
2,4-Dinitrotoluene	5.1	NA	91	5	2.2E+5	3.1E+5	7.3E+5	330
Dinoseb	7 (C)	NA	0.5 (D)	1	4.5E+6	6.3E+6	1.5E+7	20
1,4-Dioxane	320	NA	2,000	1	2.3E+6	3.2E+6	6.3E+6	10
Diquat	20 (C)	NA	(B)	1	9.9E+6	1.4E+7	3.3E+7	NA
Endosulfan (J)	4.6	NA	(B)	0.01	1.0E+6	1.5E+6	3.4E+6	3.3
Endothall	100 (C)	NA	(B)	20	7.7E+7	1.1E+8	2.5E+8	NA
Endrin	2 (C)	NA	0.0023	0.02	7.7E+5	1.1E+6	2.5E+6	20
Epichlorohydrin	350	NA	(B)	5	2.5E+6	3.5E+6	7.0E+6	10
Ethanol	5.6E+6	NA	41,000	1,000	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	4,400
Ethyl acetate	19,000	NA	1,000	NA	6.7E+8	9.4E+8	1.0E+9 (G)	NA
1-Ethyl-2-methylbenzene	ID	NA	(B)	NA	ID	ID	ID	NA
Ethylbenzene	700 (C)	74	31	1	7.2E+7	1.0E+8	2.0E+8	10
Ethylene dibromide	0.05 (C)	NA	1.1	1	290	410	810	10
Ethylene glycol	42,000	NA	68,000	5,000	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	5,000
Ethylene glycol acetate	ID	NA	(B)	NA	ID	ID	ID	NA
Ethylene glycol monobutyl ether	270	NA	(B)	NA	9.7E+8	1.4E+7	2.7E+7	NA
Fluoranthene	2,500	NA	370	5	5.4E+8	7.6E+8	1.0E+9 (G)	330
Fluorene	2,500	NA	14,000	5	5.4E+8	7.6E+8	1.0E+9 (G)	330
Fluorine	400 (C)	2,000	1,900	NA	2.7E+8	3.8E+8	8.9E+8	NA
Formaldehyde	3,800	NA	170	100	1.3E+8	1.9E+8	3.7E+8	500
Formic acid	29,000	NA	(B)	18,000	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	9.0E+5

# GENERIC INDUSTRIAL AND COMMERCIAL CLEANUP CRITERIA

REVISION 2

Chemical	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	Direct Contact Value			Target Method Detection Limit in Soil
					Industrial	Commercial Subcategory III	Commercial Subcategory IV	
1-Formylpiperidine	230	NA	(B)	NA	8.2E+6	1.1E+7	2.3E+7	NA
Gentian violet	35	NA	(B)	NA	1.5E+6	2.1E+6	5.0E+6	NA
Glyphosate	700 (C)	NA	(B)	100	4.5E+8	6.3E+8	1.0E+9 (G)	NA
Heptachlor	0.4 (C)	NA	0.0018	0.01	33,000	47,000	1.1E+5	20
Heptachlor epoxide	0.2 (C)	NA	0.0011	0.01	18,000	23,000	54,000	20
n-Heptane	92,000	NA	4	NA	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	NA
Hexabromobenzene	58	NA	(B)	(K)	1.3E+7	1.8E+7	4.2E+7	(K)
Hexachlorobenzene (C-66)	1(C)	NA	0.0019	(K)	94,000	1.3E+5	3.1E+5	(K)
Hexachlorobutadiene (C-48)	45	NA	500	(K)	1.9E+6	2.7E+6	6.4E+6	(K)
alpha-Hexachlorocyclohexane	0.55	NA	0.13	0.01	24,000	33,000	79,000	20
beta-Hexachlorocyclohexane	1.9	NA	0.46	0.01	83,000	1.2E+5	2.8E+5	20
Hexachlorocyclopentadiene (C-56)	50 (C)	NA	0.54	(K)	3.2E+7	4.5E+7	1.1E+8	(K)
Hexachloroethane	250	NA	13	2	1.8E+6	2.5E+6	4.9E+6	50
n-Hexane	8,600	NA	(B)	NA	3.1E+8	4.3E+8	8.5E+8	NA
2-Hexanone	2,900	NA	(B)	50	1.0E+8	1.5E+8	2.9E+8	100
Indeno(1,2,3-cd)pyrene (Q)	4.8	NA	0.31	5	2.1E+5	2.9E+5	6.8E+5	330
Iron	ID	300 (A)	(B)	100	ID	ID	ID	2,000
Isobutyl alcohol	6,700	NA	(B)	1,000	2.4E+8	3.3E+8	6.6E+8	4,400
Isophorone	3,700	NA	860	5	2.6E+7	3.7E+7	7.3E+7	330
Isopropyl alcohol	1,300	NA	21,000	400	4.8E+7	6.7E+7	1.3E+8	4,400
Lead	4 (A,L)	NA	6.6 (A,D)	3	4.0E+5 (L)	4.0E+5 (L)	4.0E+5 (L)	1,000
Lindane	0.2 (C)	NA	0.08	0.01	1.2E+5	1.6E+5	3.8E+5	20
Magnesium	1.2E+6	NA	(B)	30	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	3,000
Manganese	500 (A)	50 (A)	(B)	20	2.2E+7	3.0E+7	7.1E+7	2,000
Mercury (Inorganic)	2 (A,C)	NA	0.0013 (A)	0.2	1.4E+6	1.9E+6	4.5E+6	100
Methanol	10,000	NA	41,000	1,000	3.7E+8	5.2E+8	1.0E+9 (G)	4,400
Methoxychlor	40 (C)	NA	(B)	0.5	2.3E+7	3.2E+7	7.4E+7	50
2-Methoxyethanol	83	NA	(B)	NA	3.0E+6	4.2E+6	8.3E+6	NA
2-Methyl-4-chlorophenoxyacetic acid	21	NA	(B)	0.5	4.5E+6	6.3E+6	1.5E+7	100
2-Methyl-4,6-dinitrophenol	7.3	NA	0.59	20	1.6E+6	2.2E+6	5.2E+6	1,700
4-Methyl-2-pentanone (MIBK)	1,000	NA	(B)	50	3.7E+7	5.2E+7	1.0E+8	100
Methyl-tert-butyl ether (MTBE)	690	NA	380	50	2.5E+7	3.4E+7	6.8E+7	100
N-Methyl-morpholine	56	NA	(B)	NA	2.0E+6	2.8E+6	5.6E+6	NA
Methylcyclopentane	ID	NA	(B)	50	ID	ID	ID	500
4,4'-Methylene-bis-2-chloroaniline (M)	3.6	NA	(B)	1	1.6E+5	2.2E+5	5.1E+5	50
Methylene chloride	5 (C)	NA	59	5	3.3E+6	4.6E+6	9.2E+6	10
2-Methylnaphthalene	ID	NA	(B)	5	ID	ID	ID	330
2-Methylphenol	1,000	NA	38	5	3.7E+7	5.2E+7	1.0E+8	330
3-Methylphenol	1,000	NA	(B)	5	2.3E+8	3.2E+8	7.4E+8	330

# GENERIC INDUSTRIAL AND COMMERCIAL CLEANUP CRITERIA

REVISION 2

Chemical	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	Direct Contact Value			Target Method Detection Limit in Soil
					Industrial	Commercial Subcategory III	Commercial Subcategory IV	
4-Methylphenol	100	NA	6.2	5	2.3E+7	3.2E+7	7.4E+7	330
Alotolachlor	670	NA	150	10	2.9E+7	4.0E+7	9.5E+7	50
Molybdenum	100 (A)	NA	800 (A)	10	2.3E+7	3.2E+7	7.4E+7	100
Naphthalene	750	NA	29	5	1.6E+8	2.3E+8	5.4E+8	330
Nickel	100 (A,C)	NA	57 (A,D)	50	3.4E+8	4.8E+8	1.0E+9 (G)	1,000
Nitrate (P)	10,000 (C,P)	NA	(B)	100	ID	ID	ID	NA
Nitrite (P)	1,000 (C,P)	NA	(B)	100	ID	ID	ID	NA
Nitrobenzene	9.6	NA	1,900	5	3.4E+5	4.8E+5	9.5E+5	330
2-Nitrophenol	58	NA	(B)	5	1.3E+7	1.8E+7	4.2E+7	330
n-Nitroso-di-n-propylamine	0.5	NA	(B)	5	3,500	5,000	9,900	330
N-Nitrosodiphenylamine	710	NA	160	5	5.1E+6	7.1E+6	1.4E+7	330
Oxamyl	200 (C)	NA	(B)	NA	1.7E+8	2.4E+8	5.6E+8	NA
Oxo-haryl acetate	210	NA	(B)	NA	7.4E+8	1.0E+7	2.1E+7	NA
Pendimethalin	2,500	NA	0.62	0.1	5.4E+8	7.6E+8	1.0E+9 (G)	20
Pentachlorobenzene	17	NA	(B)	2	3.7E+8	5.2E+8	1.2E+7	50
Pentachloronitrobenzene	160	NA	(B)	2	3.4E+7	4.7E+7	1.1E+8	50
Pentachlorophenol	1 (C)	NA	0.8 (D)	20	1.3E+6	1.8E+6	4.1E+6	3,400
Pentane	ID	NA	(B)	100	ID	ID	ID	1,000
2-Pentene	ID	NA	(B)	NA	ID	ID	ID	NA
Phenanthrene	75	NA	(B)	5	1.8E+7	2.3E+7	5.4E+7	330
Phenol	13,000	NA	1,100	5	4.5E+8	6.2E+8	1.0E+9 (G)	330
Picloram	500 (C)	NA	(B)	10	3.2E+8	4.4E+8	1.0E+9 (G)	100
Piperidine	9.2	NA	(B)	NA	3.3E+5	4.6E+5	9.1E+5	NA
Polybrominated biphenyls (J)	0.39	NA	(B)	NA	17,000	24,000	58,000	NA
Polychlorinated biphenyls (PCBs) (J,T)	0.5 (C)	NA	2.0E-5	0.2	21,000	30,000	58,000	330
Prometon	460	NA	(B)	0.5	9.9E+7	1.4E+8	3.3E+8	20
Propachlor	270	NA	(B)	1	5.9E+7	8.2E+7	1.9E+8	20
Propazine	560	NA	(B)	0.5	1.2E+8	1.7E+8	4.0E+8	20
Propionic acid	35,000	NA	(B)	100	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	6,700
Propyl alcohol	4,000	NA	15,000	NA	1.4E+8	2.0E+8	3.9E+8	NA
Propylene glycol	4.2E+5	NA	1.9E+5	5,000	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	5,000
Pyrene	1,600	NA	11,000	5	3.4E+8	4.7E+8	1.0E+9 (G)	330
Pyridine	21	NA	20	20	7.4E+5	1.0E+6	2.1E+6	330
Selenium	50 (A,C)	NA	5 (A)	5	2.3E+7	3.2E+7	7.4E+7	500
Silver	98 (A)	100	0.1 (A)	0.5	2.1E+7	3.0E+7	7.0E+7	500
Simazine	4 (C)	NA	3.4	10	2.3E+7	3.3E+7	7.7E+7	40
Sodium	4.5E+5	NA	(B)	NA	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	NA
Styrene	100 (C)	NA	19	1	8.3E+5	1.2E+6	2.3E+6	10
Sulfate	ID	2.5E+5	(B)	NA	ID	ID	ID	NA

GENERIC INDUSTRIAL AND COMMERCIAL CLEANUP CRITERIA

REVISION 2

Chemical	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	Direct Contact Value			Target Method Detection Limit in Soil
					Industrial	Commercial Subcategory III	Commercial Subcategory IV	
Tebuthiuron	1,500	NA	(B)	NA	3.2E+8	4.4E+8	1.0E+9 (G)	NA
2,3,7,8-Tetrabromodibenzo-p-dioxin (O)	(O)	NA	(O)	0.0001	(O)	(O)	(O)	0.01
1,2,4,5-Tetrachlorobenzene	7,100	NA	0.4	0.1	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	20
2,3,7,8-Tetrachlorodibenzo-p-dioxin (O)	3.0E-5 (C)	NA	1.4E-8	1.0E-5	0.99	1.4	2.9	0.001
1,1,1,2-Tetrachloroethane	130	NA	(B)	1	9.5E+5	1.3E+6	2.7E+6	10
1,1,2,2-Tetrachloroethane	17	NA	32	1	1.2E+5	1.7E+5	3.5E+5	10
Tetrachloroethylene	5 (C)	NA	22	1	4.9E+5	6.8E+5	1.4E+6	10
Tetrahydrofuran	690	NA	3,300	1,000	2.5E+7	3.4E+7	6.8E+7	10,000
Thallium	2 (A,C)	NA	5.4 (A)	2	3.0E+5	4.2E+5	1.0E+6	500
Toluene	1,000 (C)	790	110	1	1.6E+8	2.3E+8	4.6E+8	10
p-Toluidine	18	NA	(B)	NA	7.9E+5	1.1E+6	2.6E+6	NA
Toxaphene	3 (C)	NA	0.0002	1	23,000	32,000	63,000	170
Triallate	270	NA	(B)	1	5.9E+7	8.2E+7	1.9E+8	20
Tributylamine	29	NA	(B)	NA	1.0E+6	1.5E+6	2.9E+6	NA
1,2,4-Trichlorobenzene	70 (C)	NA	22	5	6.8E+7	9.5E+7	2.2E+8	330
1,1,1-Trichloroethane	200 (C)	NA	120	1	2.1E+7	2.9E+7	5.8E+7	10
1,1,2-Trichloroethane	5 (C)	NA	65	1	4.4E+5	6.1E+5	1.2E+6	10
Trichloroethylene	5 (C)	NA	94	1	1.6E+6	2.2E+6	4.3E+6	10
Trichlorofluoromethane	7,300	NA	580	1	2.6E+8	3.6E+8	7.3E+8	10
2,4,5-Trichlorophenol	2,100	NA	25	50	4.5E+8	6.3E+8	1.0E+9 (G)	1,700
2,4,6-Trichlorophenol	320	NA	27 (D)	5	1.4E+7	1.9E+7	4.5E+7	330
2(2,4,5-Trichlorophenoxy)propionic acid (N)	50 (C)	NA	21	1	3.4E+7	4.7E+7	1.1E+8	50
1,2,3-Trichloropropane	120	NA	(B)	1	2.6E+7	3.6E+7	8.5E+7	10
1,1,2-Trichloro-1,2,2-trifluoroethane	5.6E+5	NA	33	NA	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	NA
Triethanolamine	10,000	NA	(B)	NA	3.7E+8	5.2E+8	1.0E+9 (G)	NA
3-Trifluoromethyl-4-nitrophenol	13,000	NA	32 (D)	NA	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	NA
Trifluralin	450	NA	(B)	1	2.0E+7	2.7E+7	6.4E+7	50
2,2,4-Trimethyl pentane	ID	NA	(B)	50	ID	ID	ID	500
2,2,4-Trimethyl-2-pentene	ID	NA	(B)	NA	ID	ID	ID	NA
1,2,4-Trimethylbenzene	86	NA	22	1	3.1E+8	4.3E+8	8.5E+8	10
1,3,5-Trimethylbenzene	65	NA	28	1	2.3E+8	3.2E+8	6.4E+8	10
tris(2,3-Dibromopropyl)phosphate	1.9	NA	(B)	NA	83,000	1.2E+5	2.8E+5	NA
Urea	ID (P)	NA	(B)	400	ID (P)	ID (P)	ID (P)	20,000
Vanadium	180 (A)	NA	8 (A)	20	3.9E+7	5.5E+7	1.3E+8	1,000
Vinyl acetate	1,800	NA	(B)	50	6.5E+7	9.2E+7	1.8E+8	100
Vinyl chloride	2 (C)	NA	3.1	1	11,000	16,000	31,000	10
White phosphorus (R)	0.31	NA	(B)	NA	68,000	95,000	2.2E+5	NA
Xylenes	10,000 (C)	280	59	3	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	30
Zinc	6,900 (A)	5,000 (A)	81 (A,D)	20	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	1,000



## Footnotes

- {A} Background, as defined in Rule 701(c), may be substituted if higher than the cleanup criteria.
- {B} Chemical has either not been evaluated or an inadequate data base precludes the development of a GSI value. Contact an ERD toxicologist for assistance.
- {C} State of Michigan Drinking Water Standard established pursuant to Section 5 of the Safe Drinking Water Act, Act No. 399 of the Public Acts of 1976 used as the default.
- {D} GSI value is pH, temperature, or water hardness dependent. Contact an ERD toxicologist for details.
- {E} Chemical, due to its physicochemical properties, is not expected to leach through soils to groundwater under most conditions.
- {F} Professional judgment used to determine that 50 ppb of aluminum in drinking water is protective of human health.
- {G} Criteria exceeds 100% in soil, hence it is reduced to 100%.
- {H} Criteria is based on agricultural impacts (phytotoxicity), not 20X groundwater criterion.
- {I} Valence-specific chromium data (Cr III and Cr VI) must be compared to the same valence-specific cleanup criteria. If analytical data are provided for "total" chromium only, then values for chromium VI must be applied as the cleanup criteria. Chromium III cleanup criteria can only be used at sites where groundwater is prevented from being used as a public water supply, currently or in the future.
- {J} Chemical may be present in several isomer forms. Isomer specific concentrations must be combined for comparison to criteria. Contact an ERD toxicologist for further explanation.
- {K} Two different analytical methods and target method detection limits are available for this chemical. Refer to Operational Memorandum #6 for details.
- {L} Criteria developed using the U.S. EPA Integrated Uptake Biokinetic Model for children. No risk assessment method(s) is currently available to evaluate lead toxicity in adults. Higher level may be acceptable if soil concentration is less than 400 ppm and groundwater migrating off-site will not impact adjacent properties. Contact an ERD toxicologist for further explanation.
- {M} Also known as MBOCA.
- {N} Also known as Silvex.
- {O} Use 2,3,7,8-TCDD "toxicity equivalence factors" (TEFs) for other chlorinated and /or brominated dibenzo-p-dioxins and chlorinated and/or brominated dibenzofurans for comparison to cleanup criteria. Contact an ERD toxicologist for details.
- {P} All potential sources of nitrogen-nitrate must be combined and compared to nitrate criteria. Contact an ERD toxicologist for details.
- {Q} Criteria for carcinogenic polynuclear aromatic hydrocarbons (PAHs) were developed using "relative potential potencies" (RPPs) to benzo(a)pyrene.
- {R} Chemical may be reactive in soil.
- {S} Concentrations of trihalomethanes in groundwater must be combined to determine compliance with the health-based drinking water value of 100 ppb.
- {T} Toxic Substances Control Act, Subpart G - PCB Spill Cleanup Policy standards may be more restrictive.

ID = Inadequate data to develop criterion; NA = Not available.

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

September 30, 1993

Marquette District  
ERD

TO: Environmental Response Division Staff  
FROM: Alan J. Howard, Chief, Environmental Response Division  
SUBJECT: MERA Operational Memorandum #15: Default Type A Cleanup Criteria

In order to facilitate cleanup decisions at sites at which naturally occurring metals may be of concern, the following acceptable default Type A soil cleanup criteria have been established. These values are based on analysis of the database for the Michigan Background Soil Survey (April 1991) which is maintained by Waste Management Division (WMD). They represent the mean plus one standard deviation for WMD data from combined clay, topsoil and sand categories. The values are presented in two significant figures. Data should be rounded to two significant figures for comparison.

Table 1: ACCEPTABLE DEFAULT VALUES  
TYPE A SOIL CLEANUP CRITERIA

Type B	Substance	Acceptable Concentration (mg/kg)	Substance	Acceptable Concentration (mg/kg)	Type PPN
1.0	Aluminum	6900	Iron	12000	6.0 C
C	Arsenic	5.8	Mercury	0.13	0.042 C
48, C	Barium	75	Lithium	9.8	-
0.07, C	Cadmium	1.2	Manganese	440	1.0 C
-	Cobalt	6.8	Nickel	20	11.0 C
2.4 C	Chromium (total)	18	Lead	21	C
20 C	Copper	32	Selenium	0.41	0.7 C
3.0 C	Cyanide	0.39	Silver	1.0	0.66 C
			Zinc	47	46 C

The default values apply as follows:

1. If measured concentrations at a site do not exceed the values listed in Table 1, site specific samples to establish background are not required.
2. The values apply to all soil types, statewide.
3. It is acceptable to establish a site-specific background concentration higher than the default values. Such sampling should be conducted according to requirements in existence before the issuance of this memorandum. Comparison of site values is made against the mean plus three standard deviations calculated from background samples as provided for in existing ERD guidance regarding verification of soil remediation.

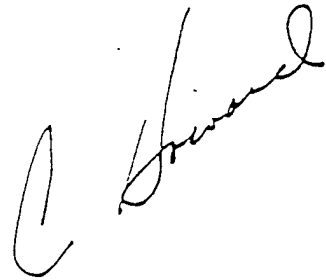
4. Staff also may approve Type A cleanups based on a regionally proximate background value higher than the default values. Comparison should be made as in #3, above.

This memorandum is intended to provide guidance to Division staff to foster consistent application of the Michigan Environmental Response Act (1982 PA 307, as amended) and the Administrative Rules promulgated thereunder. This document is not intended to convey any rights to any parties nor create any duties or responsibilities under law. This document and matters addressed herein are subject to revision.

Any questions about this memorandum should be directed to Bill Iversen at 517-373-0907.

rev. 0

cc: Dennis Drake, Air Quality Division  
Bob Miller, Surface Water Quality Division  
Tom Segall, Geological Survey Division  
Jim Sygo, Waste Management Division



**APPENDIX M: RISK ASSESSMENT**

TABLE M-1 CANCER/HAZARD ESTIMATE - SOIL INGESTION  
FUTURE LAND USE SCENARIO - CONSTRUCTION WORKER

Record#	ANALYTE	CONC UNITS	CDI CANCER	CANCER RISK	CDI NON-CANCER	NON-CANCER RISK
1	2-Methylnaphthalene	0.2221 MG/KG	.3725468269E-8	0.000000	.1043131115E-5	0.000003
2	Acenaphthene	0.2355 MG/KG	.3950237629E-8	0.000000	.1106066536E-5	0.000002
3	Acenaphthylene	0.2187 MG/KG	.3668437237E-8	0.000000	.1027162426E-5	0.000000
4	Acetone	0.0142 MG/KG	.2381884260E-9	0.000000	.6669275929E-7	.6669275929E-7
5	Anthracene	0.2077 MG/KG	.3483925076E-8	0.000000	.9754990215E-6	.3251663405E-6
6	Antimony	1.1000 MG/KG	.1845121610E-7	0.000000	.5166340508E-5	0.012916
7	Arsenic	7.7200 MG/KG	.1294939893E-6	.2330891807E-6	.36259831702E-4	0.120861
8	Benzo(a)anthracene	0.3636 MG/KG	.6098965613E-8	.4452244897E-8	.1707710371E-5	0.000006
9	Benzo(a)pyrene	0.3632 MG/KG	.6092256080E-8	.4447346938E-7	.1705831702E-5	0.000006
10	Benzo(b)fluoranthene	0.5579 MG/KG	.9358121330E-8	.6831428570E-8	.2620273972E-5	0.000009
11	Benzo(g,h,i)perylene	0.2627 MG/KG	.4406485882E-8	.3216734693E-8	.1233816046E-5	0.000004
12	Benzo(k)fluoranthene	0.6273 MG/KG	.1052222532E-7	.7681224483E-7	.2946223091E-5	0.000010
13	Beryllium	0.2200 MG/KG	.3690243220E-8	.1586804584E-7	.1033268101E-5	0.000207
14	Carbazole	0.2157 MG/KG	.3618115739E-8	.2641224489E-7	.1013072407E-5	0.000000
15	Chrysene	0.3968 MG/KG	.6655856863E-8	.931819960E-10	.1863639921E-5	0.000006
16	Di-n-butyl phthalate	0.1738 MG/KG	.2915292144E-8	0.000000	.8162818003E-6	0.000001
17	Dibenzo(a,h)anthracene	0.2167 MG/KG	.3634889572E-8	.2653469387E-7	.1017769080E-5	0.000003
18	Dibenzofuran	0.2295 MG/KG	.3849594632E-8	.2810204081E-7	.1077886497E-5	0.000000
19	Fluoranthene	0.4712 MG/KG	.7903830025E-8	0.000000	.2213072407E-5	0.000006
20	Fluorene	0.2199 MG/KG	.3688565837E-8	0.000000	.1032798434E-5	0.000003
21	Indeno(1,2,3-cd)pyrene	0.2745 MG/KG	.4604417109E-8	.1979899356E-7	.1289236790E-5	0.000004
22	Naphthalene	0.2251 MG/KG	.3775789767E-8	0.000000	.1057221135E-5	0.000004
23	Phenanthrene	0.2882 MG/KG	.4834218618E-8	.2465451495E-9	.1353581213E-5	0.000005
24	Phenol	0.2286 MG/KG	.3834498182E-8	0.000000	.1073659491E-5	0.000004
25	Pyrene	0.4337 MG/KG	.7274811294E-8	0.000000	.2036947162E-5	0.000007
26	Tetrachloroethene	0.0038 MG/KG	.637405647E-10	.325076879E-11	.1784735812E-7	.1784735812E-6
27	bis(2-Ethylhexyl)phthalate	0.2349 MG/KG	.3940173329E-8	.2876326530E-9	.1103248532E-5	0.000055

TABLE M-2 CANCER/HAZARD ESTIMATE - DERMAL CONTACT WITH SOIL  
FUTURE LAND USE SCENARIO - CONSTRUCTION

Record#	ANALYTE	CONC UNITS	CDI CANCER	CANCER RISK	CDI NON-CANCER	NON-CANCER RISK
1	2-Methylnaphthalene	0.2221 MG/KG	.4986694506E-8	0.000000	.1396274461E-5	0.000027
2	Acenaphthene	0.2355 MG/KG	.5287557660E-8	0.000000	.1480516144E-5	0.000015
3	Acenaphthylene	0.2187 MG/KG	.4910356094E-8	0.000000	.1374899706E-5	0.000000
4	Acetone	0.0142 MG/KG	.3188251327E-9	0.000000	.8927103718E-7	.1130013128E-6
5	Anthracene	0.2077 MG/KG	.4663378878E-8	0.000000	.1305746086E-5	0.000003
6	Antimony	1.1000 MG/KG	.9879088621E-9	0.000000	.2766144814E-6	0.013831
7	Arsenic	7.7200 MG/KG	.6933324014E-8	.1313682444E-7	.1941330724E-5	0.006812
8	Benzo(a)anthracene	0.3636 MG/KG	.8163719597E-8	.3505597238E-7	.2285841487E-5	0.000045
9	Benzo(a)pyrene	0.3632 MG/KG	.8154738607E-8	.3501740695E-6	.2283326810E-5	0.000045
10	Benzo(b)fluoranthene	0.5579 MG/KG	.1252623532E-7	.5378912813E-7	.3507345890E-5	0.000069
11	Benzo(g,h,i)perylene	0.2627 MG/KG	.5898264956E-8	.2532784363E-7	.1651514187E-5	0.000032
12	Benzo(k)fluoranthene	0.6273 MG/KG	.1408443702E-7	0.000001	.3943642367E-5	0.000077
13	Beryllium	0.2200 MG/KG	.1975817724E-9	.8496016213E-7	.5532289628E-7	0.001106
14	Carbazole	0.2157 MG/KG	.4842998672E-8	.2079640606E-6	.1356039628E-5	0.000000
15	Chrysene	0.3968 MG/KG	.8909141738E-8	.1861611706E-9	.2494559686E-5	0.000012
16	Di-n-butyl phthalate	0.1738 MG/KG	.3902240005E-8	0.000000	.1092627201E-5	0.000001
17	Dibenzo(a,h)anthracene	0.2167 MG/KG	.4865451146E-8	.2089281962E-6	.1362326320E-5	0.000027
18	Dibenzofuran	0.2295 MG/KG	.5152842815E-8	.2212691326E-6	.1442795988E-5	0.000000
19	Fluoranthene	0.4712 MG/KG	.1057960581E-7	0.000000	.2962289628E-5	0.000044
20	Fluorene	0.2199 MG/KG	.4937299063E-8	0.000000	.1382443737E-5	0.000020
21	Indeno(1,2,3-cd)pyrene	0.2745 MG/KG	.6163204151E-8	.1558928108E-6	.1725697162E-5	0.000034
22	Naphthalene	0.2251 MG/KG	.5054051928E-8	0.000000	.1415134540E-5	0.000028
23	Phenanthrene	0.2882 MG/KG	.6470803047E-8	.1941240914E-8	.1811824853E-5	0.000036
24	Phenol	0.2286 MG/KG	.5132635588E-8	0.000000	.1437137964E-5	0.000005
25	Pyrene	0.4337 MG/KG	.9737638034E-8	0.000000	.2726538649E-5	0.000040
26	Tetrachloroethene	0.0038 MG/KG	.853194017E-10	.435128948E-11	.2388943248E-7	.2388943248E-6
27	bis(2-Ethylhexyl)phthalate	0.2349 MG/KG	.5274086175E-8	.2264754651E-8	.1476744129E-5	0.000434

TABLE M-3 CANCER/HAZARD ESTIMATE - SOIL INHALATION  
FUTURE LAND USE SCENARIO - EXCAVATION WORKER

Record#	ANALYTE	CONC UNITS	CDI CANCER	CANCER RISK	CDI NON-CANCER	NON-CANCER RISK
1	2-Methylnaphthalene	0.2221 MG/KG	.8436616742E-8	0.000000	.2362252687E-5	0.000008
2	Acenaphthene	0.2355 MG/KG	.8945624686E-8	0.000000	.2504774912E-5	0.006262
3	Acenaphthylene	0.2187 MG/KG	.8307465473E-8	0.000000	.2326090332E-5	0.007754
4	Acetone	0.0142 MG/KG	.5393964779E-9	0.000000	.1510310138E-6	0.000265
5	Anthracene	0.2077 MG/KG	.7889623131E-8	0.000000	.2209094476E-5	0.000007
6	Antimony	1.1000 MG/KG	.4178423420E-7	0.000000	.1169958557E-4	0.000039
7	Arsenic	7.7200 MG/KG	.2932493527E-6	0.000004	0.0001	0.000333
8	Benzo(a)anthracene	0.3636 MG/KG	.1381158868E-7	.1008245973E-6	.3867244832E-5	0.000013
9	Benzo(a)pyrene	0.3632 MG/KG	.1379639442E-7	.1007136792E-6	.3862990437E-5	0.007726
10	Benzo(b)fluoranthene	0.5579 MG/KG	.2119220387E-7	.1547030882E-6	.5933817085E-5	0.000424
11	Benzo(g,h,i)perylene	0.2627 MG/KG	.9978834841E-8	0.000000	.2794073755E-5	0.000009
12	Benzo(k)fluoranthene	0.6273 MG/KG	.2382840919E-7	.1739473870E-6	.6671954575E-5	0.000022
13	Beryllium	0.2200 MG/KG	.8356846840E-8	.7019751345E-7	.2339917115E-5	0.000468
14	Carbazole	0.2157 MG/KG	.8193508470E-8	.1638701694E-9	.2294182371E-5	0.000008
15	Chrysene	0.3968 MG/KG	.1507271284E-7	.1100308037E-6	.4220359597E-5	0.000000
16	Di-n-butyl phthalate	0.1738 MG/KG	.6601909004E-8	0.000000	.1848534521E-5	0.000002
17	Dibenzo(a,h)anthracene	0.2167 MG/KG	.8231494138E-8	.6008990720E-7	.2304818358E-5	0.000008
18	Dibenzofuran	0.2295 MG/KG	.8717710681E-8	0.000000	.2440958990E-5	0.000000
19	Fluoranthene	0.4712 MG/KG	.1789884650E-7	0.000000	.5011677021E-5	0.008792
20	Fluorene	0.2199 MG/KG	.8353048274E-8	0.000000	.2338853516E-5	0.004103
21	Indeno(1,2,3-cd)pyrene	0.2745 MG/KG	.1042706571E-7	.7611757968E-7	.2919578400E-5	0.000010
22	Naphthalene	0.2251 MG/KG	.8550573744E-8	0.000000	.2394160648E-5	0.003990
23	Phenanthrene	0.2882 MG/KG	.1094746936E-7	0.000000	.3065291421E-5	0.005474
24	Phenol	0.2286 MG/KG	.8683523581E-8	0.000000	.2431386602E-5	0.000004
25	Pyrene	0.4337 MG/KG	.1647438397E-7	0.000000	.4612827513E-5	0.008093
26	Tetrachloroethene	0.0038 MG/KG	.1443455363E-9	.259821965E-12	.4041675017E-7	.4041675017E-6
27	bis(2-Ethylhexyl)phthalate	0.2349 MG/KG	.8922833286E-8	.1249196660E-9	.2498393320E-5	0.004383

TABLE M-4 SLOPE AND RFD VALUES

Record#	CHEMICAL	OCRFD	OSRFD	ICRFD	ISRFD	OSF	ISF	ABS
1	2-METHYLNAPHTHALENE	N/A	0.3	N/A	0.3	N/A	N/A	0.17
2	ACENAPHTHENE	0.06	0.6	0.06	0.0004	N/A	N/A	0.17
3	ACENAPHTHYLENE	0.04	N/A	0.0006	0.0003	N/A	N/A	0.17
4	ACETONE	0.1	1	0.1	0.00057	N/A	N/A	0.79
5	ANTHRACENE	0.3	3	0.3	0.3	N/A	N/A	0.17
6	ANTIMONY	0.0004	0.0004	0.0004	0.3	N/A	N/A	0.05
7	ARSENIC	0.0003	0.0003	0.0003	0.3	1.8	15	0.95
8	BENZO(A)ANTHRACENE	0.04	0.3	0.04	0.3	0.73	7.3	0.17
9	BENZO(A)PYRENE	0.04	0.3	0.04	0.0005	7.3	7.3	0.17
10	BENZO(B)FLUORANTHENE	0.04	0.3	0.04	0.014	0.73	7.3	0.17
11	BENZO(G,H,I)PERYLENE	0.04	0.3	0.04	0.3	0.73	N/A	0.17
12	BENZO(K)FLUORANTHENE	N/A	0.3	N/A	0.3	7.3	7.3	0.17
13	BERYLLIUM	0.005	0.005	0.005	0.005	4.3	8.4	0.01
14	BIS(2-ETHYLHEXYL) PHTHALATE	0.02	0.02	0.02	0.00057	0.073	0.014	0.17
15	CARBAZOLE		N/A		0.3	7.3	0.02	0.17
16	CHRYSENE	0.1	0.3		1	0.014	7.3	0.67
17	DI-N-BUTYL PHTHALATE	0.03	1.0		0.3	N/A	N/A	0.8
18	DIBENZO(A,H)ANTHRACENE	0.004	0.3	0.03	ND	7.3	7.3	0.17
19	DIBENZOFURAN	0.04	N/A	0.004	ND	7.3	N/A	0.17
20	FLUORANTHENE	0.04	0.4	0.04	0.00057	N/A	N/A	0.17
21	FLUORENE	0.04	0.4	0.04	0.00057	N/A	N/A	0.17
22	INDENO(1,2,3-CD)PYRENE	0.04	0.3	0.04	0.3	4.3	7.3	0.17
23	NAPHTHALENE	0.04	0.3	0.04	0.0006	N/A	N/A	0.17
24	PHENANTHRENE	0.03	0.3	0.03	0.00056	0.051	N/A	0.17
25	PHENOL	0.6	0.3	0.6	0.6	N/A	N/A	0.9
26	PYRENE	0.03	0.3	0.03	0.00057	N/A	N/A	0.23
27	TETRACHLOROETHENE	0.01	0.1	0.01	0.1	0.051	0.0018	1